



SPACE GENERATION
ADVISORY COUNCIL

ANNUAL REPORT 2021



SPACE GENERATION
ADVISORY COUNCIL

In support of the United Nations Programme
on Space Applications

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The Space Generation Advisory Council (SGAC) in Support of the United Nations Programme on Space Applications is a non-profit organisation 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 organisation is supported by a volunteer network of over 21,000 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 ever grateful for the generous support of its sponsors and partners, who continue to expand both their financial and intellectual contributions to the organisation. From scholarships to mentoring, to advising and sponsoring, contributions from our sponsors are invaluable towards creating the experience that SGAC is able to offer its members. With in-person and hybrid events beginning again in 2021 after the global pandemic, our sponsors' support enabled hundreds of SGAC members to enjoy events including the Space Generation Congress and the Space Generation Fusion Forum. SGAC would like to thank all our sponsors and partners again for their contributions towards another successful year for SGAC.

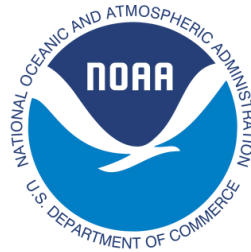
Platinum



Gold



BLUE ORIGIN



Silver



Bronze





National Space Agencies



Partners



eurisy



SDA Bocconi
SCHOOL OF MANAGEMENT



World Space
Week OCTOBER 4-10

KARMAN





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.

2021 has again been a challenging year for us all. SGAC members have shown that our connection is stronger than ever, that our passion still burns bright, and that our commitment to building a better future through space remains resilient. 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.

SGAC has the mission to empower the next generation of space leaders by providing a platform for students and young professionals to learn, acquire new skills, develop a global space network, prepare for new horizons, and overall, grow personally and professionally. During the global pandemic we have continued to deliver on this mission. As an inherently global organisation with volunteers working online together across the world, SGAC was well placed to harness the energy and experience of our members to pivot swiftly to online events. As the world has re-opened, we have returned to in-person activities without forgetting the lessons learnt from this experience.

SGAC empowers the next generation to be the change we wish to see in the space industry. In recognition of the key values of SGAC, we have welcomed a new project group on diversity and gender equality. It is our priority to make SGAC a safe, inclusive, and positive environment for the next generation.

Looking forward, this year SGAC received incredible news that will transform SGAC for years to come. SGAC was selected to receive a \$1 million grant from Blue Origin's Club for the Future. This incredibly generous donation will allow us to kickstart our visionary endowment fund to support long term growth for SGAC and sustainably provide more scholarships that enable access to international, regional, and local space events for our members. This contribution marks a historic moment for SGAC and will certainly build a solid base for the future as we continue to provide an important, international platform as a voice for the next generation.

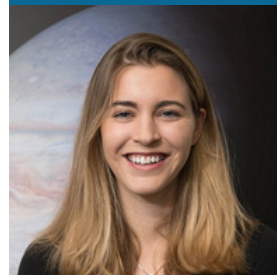
Stay healthy and our best wishes for 2022!
Per aspera ad astra!



Harriet Brettle
SGAC Chair



Anthony Yuen
SGAC Co-Chair



Harriet Brettle,
SGAC Chair



Anthony Yuen,
SGAC Co-Chair

Letter from the Executive Director

Dear members, colleagues, and supporters, Dear SGAC members, partners, supporters, and colleagues,

SGAC has completed another successful year as we continue to grow the SGAC network, increase the number of opportunities for the next generation, and extend our presence within the global space industry.

We are proud of the achievements of the organisation and its members. SGAC has now more than 20,000 members and alumni from more than 165 countries within the six SGAC regions. In 2021, SGAC worked with sponsors and partners to offer more than 100 scholarships and awards to support the next generation of students and space professionals to attend conferences and events around the world. These numbers reflect the upward trajectory of SGAC's growth and its commitment to the talented next generation of leaders by facilitating their participation in international conferences, meeting space sector leaders, and increasing their professional development.

The organisation continued its effort to grow its local and regional presence. In total, More than 20 congresses, workshops, and events were organised in 2021, including the 5th SGx event, the 10th Space Generation Fusion Forum, the 19th Space Generation Congress and, 5 Space Generation Workshops (one in each SGAC region) and more than 15 local events (including its SG[countries] series, partnered and endorsed events).

In 2021, SGAC issued a new opportunity for new project groups in order to offer a wider variety of topics for its members to learn from, bringing the total number of SGAC project groups to 11. A Policy and Advocacy Platform (SGAPP) has also been formed to solicit, collect and shape inputs and needs of our members in order to draft position papers, policy briefs, and recommendations which will address SGAC stakeholders, international organisations and space policy-making forums such as UN COPUOS.

Over the course of the year, SGAC has continued to support the UN by actively participating at the UN COPUOS meetings, and other events by the UNOOSA. In February 2021, the UNOOSA and SGAC continued to work jointly in supporting young people in line with the Secretary General's Youth 2030 strategy, launched in September 2018. Together, we have delivered the 3rd edition of 'Space for Youth' Competition aimed at engaging youth in the discussion of how space science and technology can be relevant on the topic of Climate Change. The competition invited participants to submit examples in their communities and to amplify the voice of the youth in space policy-making by issuing the winning entries to the UN COPUOS.

Last but not least, in order to ensure the sustainability and continued growth of the organisation, SGAC was able to hire a third paid staff member to support the efforts of the SGAC Executive Director and SGAC Chief of Staff: the first SGAC Remote Intern. The groundwork laid in previous years has allowed SGAC to continue to be the largest international network of students and young professionals in the space sector. The successes of this year would not be possible without the continued hard work and dedication of our volunteer members, sponsors, partners and supporters. We are grateful for their time, effort, and dedication towards making SGAC grow.



Davide Petrillo
SGAC Executive Director



Davide Petrillo,
SGAC Executive
Director

Executive Members

CHAIRPERSONS

Harriet Brettle
United Kingdom

Anthony Yuen
Australia

EXECUTIVE OFFICE

Davide Petrillo
Italy
Executive Director

Valentina Luchetti
Italy
Operations Manager

Daniel Seybold
Germany
Treasurer

Hamza Hameed
Pakistan
General Counsel Coordinator

Phylis Makurunje
Zimbabwe
Executive Secretary

Kristine Jane Atienza
Philippines
Executive Secretary

Antonino Salmeri
Italy
**Advocacy and Policy
Platform Coordinator**

Giuliana Rotola
Italy
**Advocacy and Policy
Platform Coordinator**

Alessandra Vernile
Italy
Project Groups Coordinator

**Joshua
Critchley-Marrows**
Australia
Project Groups Coordinator

Tasman Andrew Powis
Australia
SGFF Manager

Kelsey Doerksen
Canada
SGC Manager

Ginny Randall
United States
SGx Manager

Selene Cannelli
Italy
HR Team Coordinator

Abraham Akinwale
Nigeria
HR Team Coordinator

Mehdi Scoubeau
Belgium
**Regional Events
Coordinator**

Charlotte Flory
France
Local Events Coordinator

Sabrina Alam
United Kingdom
Alumni Team Coordinator

Maria Grulich
Germany
**Scholarships Team
Coordinator**

Michael Kretzenbacher
Australia
**Scholarships Team
Coordinator**

Victoria Da-Poian
Spain
Mentoring Team Lead

Shayna Hume
United States
Mentoring Team Lead

Ewerton de Marchi
Brazil
Reports Team Coordinator

Richard Nederlander
United States
Reports Team Coordinator

Erin Gibbons
Canada
**PR & Communication
Team Lead**

Maggie Handler
United States
**PR & Communication
Team Lead**

Laud Bentil
Ghana
Web & Data Team Lead

Victor Dennis
Nigeria
Remote Intern

SGAC Regional Coordinators

Iliass Tanouti
Morocco
RC for Africa

Rania Toukebri
Tunisia
RC for Africa

Bernadette Detera
Philippines
RC for Asia-Pacific

Kentha Watanabe
Japan
RC for Asia-Pacific

Eleonora Lombardi
Italy
RC for Europe

Alexandra Jercaianu
Romania
RC for Europe

Rawan AlShammari
Kuwait
RC for Middle-East

Ahmed Baraka
Egypt
RC for Middle-East

Angel Arcia Gil
Panama
**RC for North, Central
America and the Caribbean**

Elizabeth Barrios
United States
**RC for North, Central
America and the Caribbean**

Isi Casas Del Valle P.
Chile
RC for South America

Santiago Enriquez
Argentina
RC for South America

OUTPUT AT A GLANCE



20,000+
members



160+
countries



30+
SGAC events



11
Project Groups



1 new Project Group: the Diversity and Gender Equality (Our Giant Leap) Project Group was introduced in 2021, bringing the total count to 11



1 new full time paid internship: SGAC's first remote intern was recruited and worked from September to December 2021



1 new Co-Chair: Anthony Yuen (Australia) was hired as the new Co-Chair of SGAC



134
new staff recruited



162
mentee/mentor matches



Scholarships

The SGAC Scholarships are one of the core opportunities offered to active members of the Space Generation Advisory Council. SGAC and its partners host a number of scholarships for students and young professionals to attend the Space Generation Congress (SGC), the International Astronautical Congress (IAC), the Space Generation Fusion Forum (SGFF), the Space Symposium (SS), the SATELLITE, the SGx, regional and local SGAC events and other space events.



In 2021, SGAC was pleased to award the following scholarships to SGAC members:

Scholarship/Award/Competition	Event Supported	Number of Awardees
Global Grants Program	SGFF2021	5
SGAC4Steam Scholarship	SGFF2021	1
SEDS Scholarship	SGFF2021	1
University of North Dakota	SGFF2021	1
Brooke Owen Fellowship	SGFF2021	3
University of Colorado Boulder	SGFF2021	1
UKSA	SGFF2021	1
OHB SE Scholarship	SGC2021	1
SGC 2022 Logo Competition	SGC2021	1
Future Space Leaders Grant Program	SGC2021	7
NASA AES	SGC2021	1
NASA SCaN	SGC2021	5
SGLA	SGC2021	5
ASI	SGC2021	3
ISEB ESA	SGC2021	5
ISEB NASA	SGC2021	2
ISEB CSA	SGC2021	2
SGAC4Steam Scholarship	SGC2021	1
ESA – Scholarship	SGC2021	1
Emerging Space Leaders	SGC2021	6
\$pace is Business Competition	SGC2021	1
Space Solar Power	SGC2021	3
UKSA	SGC2021	1
African Space Leaders Award	AF-SGW 2021	7
SGAC – LSA NewSpace Europe 2021 – Pitch Competition	LSA NewSpace Europe	4
SGAC-SSPI Essay Competition	SGx/SATELLITE	1
Space4Youth Competition	Space4Youth Competition	3
Space Health Risks 2021 Competition	Project Group competition	10
SG[Egypt] OGL artwork	SG Egypt	3
ESA Astronaut Medical Certificate Grant	N/A	2
African Union GMSE Competition	African Union GMSE Competition	6

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

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

MARCO ROMERO

Angola

SGAC National Point of Contact - Angola



February

KINGSLEY AHENKORA-DUODU

Ghana

4th AF-SGW - Event Manager



February

CHARLES-AIMÉ NZEUSSI MBOUEND

Cameroon

SGAC National Point of Contact - Cameroon



March

SG[GERMANY] ONLINE ORGANISING TEAM



April**MEHDI SCOUBEAU***Belgium*SGAC Regional
Events Coordinator**May****ALINA VIZIREANU***Romania*SGAC HR Team
Membership Manager**June****GIULIANA ROTOLA***Italy*SGAC Space Law and Policy
Project Group - Co-Lead**July****SG[FRANCE]2021
ORGANISING TEAM****August****LAUD BENTIL***Ghana*SGAC Web & Data
Team - Co-Lead**September****ABRAHAM AKINWALE***Nigeria*SGAC National Point
of Contact - Angola**October****SGC 2021
ORGANISING TEAM****November****JOSHUA SCHERTZ***USA*

SGAC Treasurer

**December****LEEHANDI DE WITT***South Africa*SGAC National Point
of Contact - South Africa

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 2020, the Pioneer Award was awarded to Maria Grulich, Tania Robles, Pauline Delande, and Sahith Reddy Madara.

The Pioneer Award recipients for 2021 are:



Antonio Stark (South Korea)



SGAC Regional Coordinator - Asia-Pacific (AP)

Antonio Fowl Stark [KangSan Kim] is a South-Korean born International Business Developer and Space Policy Consultant. An expedition member to the Arctic (FutureTalks Foundation) and the Himalayas (UHG Foundation), he works in providing interdisciplinary strategy and insight. His past work in sustainability at Young Sustainable Impact and the World Federation of United Nations Associations inspired him to take action for a better world – both on Earth and in space. His expertise is in global corporate strategy and technology evaluation, where he worked at global VC firms and startup accelerators like SoftBank Ventures, T-Hub, 500 Startups, Standard Graphene and Unilever.



Saira Roxana Williams (Nicaragua)



SGAC National Point of Contact - Nicaragua

Roxy Williams is a Computer Engineering student, SGAC National Point of Contact for Nicaragua and General Coordinator for the Open Course Introduction to Space Engineering in the Space Generation Advisory Council. She has been a crew commander in virtual analog programs and one of the projects that she developed along with her crew was the design of a Lunar Hospital using Lava tubes. In addition, Roxy is driven by a passion for inclusion and diversity in the space industry. She has been a delegate in many of the SGAC workshops, including in the NASA Planetary Defense, Deep Space Exploration and SmallSats Constellations in LEO working groups, and led the “Meet The Women Behind SGAC” series as part of the Our Giant Leap working group.



Rania Toukebri (Tunisia)



SGAC Regional Coordinator - Africa (AF)

Rania Toukebri is the SGAC Regional Coordinator for Africa and was re-elected in June 2021. As a space engineer, she works on the design, verification and integration of spacecraft, and has been part of several European Space Agency projects for earth observation, planetary defence and space exploration. Rania was selected as a mentor for UNOOSA's Space for Women programme, awarded one of the “Top 10 Under 30” space experts in Africa in 2019, and awarded in the Top 3 of the Ten Outstanding Young Persons nominated by JCI Tunisia in 2021. She is also Chief Executive Officer for Tod'aers with the aim of enhancing international space research.

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 2021 was presented to Dr. Ken Davidian at the 2021 Space Generation Congress.



Dr. Ken Davidian



Dr. Davidian has been selected based on his ongoing support and engagement with SGAC, being an advisor to the SGAC Commercial Space Project Group and tirelessly developing and supporting the "\$pace is Business" competition since 2012. Dr. Davidian has been actively advocating for young professionals and students across the space sector for the better understanding of the entrepreneurial mindset and space economy global expansion.

Currently, Dr. Davidian serves as the Chair of the IAD Entrepreneurial & Investment Committee, and Vice Chair of the IAF Space Economy Committee. Prior to FAA AST, Dr. Davidian worked for the NASA Lewis (now Glenn) Research Center, International Space University, Paragon Space Development Corporation, X PRIZE Foundation, and NASA Headquarters.

Ambassador Award

Through the SpaceGen Ambassador Award programme, SGAC wants to acknowledge organisations that deeply care for our generation, our talents, skills and needs that actively support us as the 'next' generation of space leaders, empower us as such and enable us to grow. The award is presented to an organisation from the space sector, either governmental, non-governmental, or private company that demonstrates genuine care for the next generation, actively supporting and empowering young space professionals and students.

SGAC is pleased and honoured to announce that the 2021 recipient of the SpaceGen Ambassador Award is Blue Origin.



Blue Origin has been a longstanding sponsor and partner of SGAC, greatly contributing 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.

The significance of our partnership with Blue Origin is reflected in our many partnership accomplishments, and we are greatly thankful for the generous donation of \$1 Million presented in July 2021 through Club for the Future. This grant will allow us and our members to propel our space endeavours into prominence in the space sector, update our infrastructure and governance to better support our members throughout the world, and expand SGAC's presence in emerging space regions to build closer relationships with regional partners, generating greater impact in local areas.

In addition, through Blue Origin's Club for the Future generous donation, we are ready to start our visionary endowment fund which will allow us to support long term growth for SGAC and sustainably provide more scholarships that enable access to international, regional, and local space events for our members.





Conferences, Events and Workshops



Global

- SGx (Washington DC, USA)
- SGC (Dubai, UAE)
- SGFF (Colorado Springs, Colorado, USA)



Local

- SG[Egypt] (Online)
- SG[France] (Lille)
- SG[Germany] (Online)
- ISSC (Milan)



Regional

- AP-SGW - Asia Pacific Space Generation Online Workshop (online)
- E-SGW - 5th European Space Generation Workshop (online)
- AF-SGW - 4th African Space Generation Workshop (Accra, Ghana)
- AF-SGW - 5th African Space Generation Workshop (Stellenbosch, South Africa)



Conferences and Events with Official SGAC Representation

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

- UNOOSA Scientific and Technical Subcommittee, 19-30 April 2021 (Vienna, Austria)
- UNOOSA Legal Subcommittee, 31 May - 11 June 2021 (Vienna, Austria)
- 64th Committee on the Peaceful Uses of Outer Space, 25 August - 3 September 2021 (Vienna, Austria)
- SATELLITE Show, 7-10 September 2021 (Washington DC, USA)
- World Knowledge Forum, 14-16 September 2021 (Seoul, South Korea)
- G20 Economy Space Leaders Meeting, 21-22 September 2021 (Rome, Italy)
- International Astronautical Congress 2021, 23-29 October 2021 (Dubai, United Arab Emirates)

Papers, Publications and Presentations

SPACE LAW AND POLICY PG

Chan, Yuk Chi. "Report on LTS Guidelines National Implementation." 60th Legal Subcommittee, UNCOPOUS. 2021.

Giuliana Rotola, Leah Farrar, Maya Nasr, Lindsey Wiser, Rutwik Naval Gund, Ludovica Ciarravano, and Kyran Grattan. Earth Observation Data, Climate Change, and Human Rights. January 2022. <<https://www.jusadastra.org/SGAC-Law-Climate-Change.html>>.

Kyran Grattan, Maya Nasr, Giuliana Rotola, Ruvimbo Samanga. Human Rights and International Space Law. January 2021. <<http://www.jusadastra.org/SGAC-Law-Human-Rights.html>>.

Maxwell Zhu, Giuliana Rotola, Kyran Grattan, Antonio Salmeri. "Next Generation Space Policy." ASCEND 2021. 2021.

Maya Nasr, Lindsey Wiser, Rahim Talibzade, Giuliana Rotola, Ivan Fino, Kyran Grattan, David Eagleson, Annaliese Meyer, Emma Loudon. "Planetary Protection and Martian ISRU." Global Space Exploration Conference. St. Petersburg, 2021.

Rishin Aggarwal, Arjun Vijaykumar, Dhanisha Sateesh, Raj Panchal, Mehdi Lali, Rania Toukebri, Smiriti Srivastava. "Design and Analysis of Space Transportation Systems for Asteroid Resource Utilization: A Base for Development of Future Mars Habitats." International Astronautical Congress. Dubai, 2021..

SPACE AND CYBERSECURITY PG

Laetitia Zarkan Cesari, Antonio Carlo, Lucille Roux, Rania Toukebri, Dr. Nebile Pelin Manti. "Space as NATO's Operational Domain: The Case of the Cyberthreats against GNSS." International Astronautical Congress. Dubai, 2021.

NEAR EARTH OBJECT PG

Rishin Aggarwal, Arjun Vijaykumar, Dhanisha Sateesh, Raj Panchal, Mehdi Lali, Rania Toukebri, Smiriti Srivastava. "Design and Analysis of Space Transportation Systems for Asteroid Resource Utilization: A Base for Development of Future Mars Habitats." International Astronautical Congress. Dubai, 2021.

Smiriti Srivastava, Arjun Vijaykumar, Nandini Singh, Raj Panchal, Dhanisha Sateesh, Pavithra Manghaipathy, Marco Romero. "Role of SGAC in Global Planetary Defence Outreach." UNOOSA IAA Planetary Defense Conference PDC. April 2021.

Smiriti Srivastava, Arjun Vijaykumar, Pavithra Manghaipathy, Raj Panchal, Dhanisha Sateesh, Nandini Singh, Ranjan Sharma,. "Near-Earth Objects (NEO) 2030; Forecasting The Future Of NEO Studies And Youth Involvement For Sustainable Development Goals (SDGs)." Global Space Exploration Conference. St. Petersburg, 2021.

DIVERSITY AND GENDER EQUALITY PG

Akischeva, Yulia. "Next Generation's Recommendations and Call to Action for Gender Equality and Diversity in the Space Sector." 64th UN COPUOS Session. 2021.

Akischeva, Yulia and Delande, Pauline. "Presentation of the Diversity & Gender Equality Project Group." SGAC Space Leaders Forum. 2021.

Diversity and Gender Equality PG. "Presentation of the Diversity & Gender Equality Project Group." World Space Week 2021 for the Iranian SGAC branch; SG[Egypt]; Edinburgh Women in Space. 2021.

Diversity and Gender Equality PG. "How to launch your career in the space industry with SGAC." Summer Space Festival. 2021..

Diversity and Gender Equality PG. "Women in Space." UNIVERSEH Student Conference. 2021.

SPACE MEDICINE AND LIFE SCIENCES PG

Niseem Abdelielil, Bruno Pavletic, Ahmed Baraka, Kristi Ray, Rochelle Velho, Anthony Yuen. "Medical Considerations for a Permanent Martian Habitat." Aerospace Medical Association. 2021.

Ray, Kristi. "Aerospace Medicine Panel." UTMB. 2021.

Ray, Kristi. "Space Medicine Panel." SEDS Space Vision. 2021.

Rochelle Velho, Anthony Yuen. "Space Medicine Panel." SG[Egypt]. 2021.

SMALL SATELLITES PG

Colpari, Ricardo. "Conceptual Analysis for a Technology Demonstration Mission of the Ion Beam Shepherd." Aerospace European Conference. Warsaw, 2021.

Miralles, Pablo. "Machine Learning in Earth Observation Operations: A Review." International Astronautical Congress. Dubai, 2021.

Muhire, Desire. "A Review of Near Future Optical Technology for High-Speed and Secure CubeSat Comms ." International Astronautical Congress. Dubai, 2021.

Small Satellites PG. "How does space help us to face climate change?" SG[France]. Strasbourg, 2021.

Small Satellites PG. "Space4Climate Action." World Space Forum. 2021.

Small Satellites PG. "Towards a Lunar Generation." Moon Village Association. 2021.

Stepanova, Daria. "Small Satellites potential for Greenhouse Gas and CO2 Monitoring ." International Astronautical Congress. Dubai, 2021..

SPACE EXPLORATION PG

Ankita Vashishtha, Ekaterina Seltikova, Andrew Foster. "Analysis of Potential Settlement Locations on the Martian Surface." International Astronautical Congress. Dubai, 2021.

Bram de Winter, Gerald Ganssen. "Scientific advancements and space exploration, uncertainties and unknowns as a driving force." International Astronautical Congress. Dubai, 2021.

Bram de Winter, Guadalupe Espinoza Gastelum, Zukhruf Jamil, Nitya Jagadam, Ilaria Cinelli. "Space education, space research and space industry: connecting a fragmented chain." International Astronautical Congress. Dubai, 2021.

Florian Scarpisi, Paolo Pino, Lorenzo Rabagliati, David Gomez-Fernandez, Silvia Panetta, Davide Carabellese, Antonino Salmeri. "The unsolved challenges of space biospheres: a research agenda." International Astronautical Congress. n.d.

Guadalupe Espinoza Gastelum, Dulce Janet Chiquito López. "Opportunities on National Security, Agriculture Development, and Social Equity through Space Technologies in Mexico." International Astronautical Congress. Dubai, 2021.

Guadalupe Espinoza Gastelum, Dulce Janet Chiquito López. "Implementing astronaut mitigation strategies to overcome isolation during a quarantine." International Astronautical Congress. Dubai, 2021.

Mrityunjai Verma, Vatasta Koul, Umang Jain, Srishti Bansal. "The evolution and innovation of the astronaut selection process over time." International Astronautical Congress. Dubai, 2021.

Paolo Pino, Adam Hugo, Mohammad Milhim. "Powering Sustainable Moon Exploration: Energy Strategies for Interoperability and Cooperation." International Astronautical Congress. Dubai, 2021.

Paolo Pino, Antonino Salmeri, Adam Hugo, Adam Marcinkowski, Aleksandra Kozawska, Ankita Vashishtha, Ekaterina Seltikova, Hussain Bokhari, Mohammad Milhim, Pablo Bedialauneta, Paolo Guardabasso, Romain Fonteyne, Shayna Hume, Simone Paternostro, Lorenzo Rab. "Towards a Lunar Exploration Technology Adaptive Roadmap: Contributions from SGAC's Technical Unit Research for a Thriving Lunar Ecosystem." International Astronautical Congress. Dubai, 2021.

Romaine Fonteyne, Ekaterina Seltikova, Hussain Bokhari, Ankita Vashishtha. "Conceptual design of a Lunar Dust Removing Vehicle." International Astronautical Congress. Dubai, 2021.

Simone Paternostro, Paolo Guardabasso, Pablo Bedialauneta, Romain Fonteyne. "Lunar landing necessary building blocks and good practices for a sustainable development of human lunar activities." International Astronautical Congress. Dubai, 2021.

SPACE TECHNOLOGY FOR EARTH APPLICATIONS PG

Desire Muhire, Alessandro Novellino, Barthelemy Ndongo, Charles-aime Nzeussi Mbouendeu, Lako Mbouendeu Stephane, Krittanon Sirorattanakul. "Flood Risk Assessment in Cameroon: The Past." IGCP 734 Annual Workshop. 2021.

Desire Muhire, Swarnajyoti Mukherjee, Krittanon Sirorattanakul, Charles-aime Nzeussi Mbouendeu, Victor Hertel, Ikechukwu Maduako, Chukwuma Okolie, Daniela Vargas-Sanabria, Lako Stephane, Ikenna Arungwa, Avaniya Menon, Abinash Silwal, Alessandro Novellino. "Integrating Social Media and Remote Sensing Data for Flood Assessment in Developing Countries: A Case Study in Douala Estuary, Cameroon." International Astronautical Congress. Dubai, 2021.

Eva Fernández-Rodríguez Zahra Okba, Lisah Ligono, and Cristhian Timoté. "Feasibility of Ocean Farming through Fusion of GNSS-R and Other Earth Observation Data." ION GNSS+. Missouri, 2021.

Fernández-Rodríguez, Eva. "Live demonstration of data processing using artificial intelligence and satellite data for ocean farming applications." International Astronautical Congress. Dubai, 2021.

Krittanon Sirorattanakul, Alessandro Novellino, Swarnajyoti Mukherjee, Desire Muhire, Kristine Jane Atienza, Daniela Vargas-Sanabria, Rushanka Amrutkar, Md. Nazmus Sadat, Cindy L. Valdez, Henry Ibitolu, Ciro Farinelli, Charles-aimé Nzeussi Mbouendeu. "Perceptions of space-related non-governmental organisations in disaster risk management revealed from a questionnaire-based study." STEA PG Technical Reports (2021).

Swarnajyoti Mukherjee, Krittanon Sirorattanakul, Daniela Vargas-Sanabria, Samridh Patial, Abinash Silwal, Kristine Jane Atienza. "Supplementing Earth Observation with Twitter data to improve disaster ." International Astronautical Congress. Dubai, 2021.

ACTIVITY HIGHLIGHTS

General

SGAC welcomed Anthony Yuen (United States) as the new SGAC Co-Chair

SGAC held the 19th Space Generation Congress in Dubai and the 19th Space Generation Fusion Forum in Colorado Springs, USA

SGAC was selected to receive \$1 million from Blue Origin's Club for the Future fund, and Blue Origin was announced as the recipient of the 2021 SpaceGen Ambassador Award

SGAC alumnus Chris Boshuizen donated \$5000 to SGAC for two new scholarships

Five new directors were appointed to the SGAC US board

SGAC launched the new Space Generation Advocacy and Policy Platform (SGAPP)

SGAC partnered with the UNOOSA to organise the 3rd edition of the Space for Youth Competition, supporting climate, the 13th Goal of the UN Sustainable Development Goals, with "Space as a tool to foster climate mitigation and adaptation"

SGAC selected Valentina Luchetti as the new SGAC Operations Manager

SGAC's Executive Director, Davide Petrillo, elected as IAF Vice-President

SGAC appointed Victor Dennis as the first ever remote working intern, and the third full-time paid employee of SGAC



Regional



AFRICA

- After postponement from 2020 due to the COVID-19 pandemic, the 4th AF-SGW took place in February 2021 at the University of Ghana in Accra. The theme of the workshop was “A United Africa for Space Innovation: A Step Towards Our Common Future”.
- The 5th AF-SGW was also held in 2021 in a hybrid mode at Stellenbosch, Western Cape, South Africa in November. The theme was “Building a Self-Sustaining African Space Sector”.
- A new Regional Coordinator for the region was on-boarded and another was re-elected.
- A total of 24 NPoCs were appointed for the region.
- Members of SGAC formed more than half of the Top 10 Under 30 African Space Industry Award Class of 2021 recipients.



MIDDLE-EAST

- The Space Generation Congress was held in Dubai from October 21-23, 2021 with over 150 delegates attending.
- Rawan Alshammari from Kuwait was elected as the new Regional Coordinator for the Middle East.
- In celebration of Women’s History Month, the NPoC of Iran participated in OGL’s “Meet the Women Behind SGAC” webinar for the episode: “Untraditional ways to space”.



SOUTH AMERICA

- The first virtual SGW was conducted, open to multiple nationalities and participants from the region. Speakers and mentors from all over the world were able to bring new perspectives and ideas for the region.
- Awards were given to members of our region to participate in SGC and IAC 2021 in Dubai.
- Multiple virtual events were organised during the year, from independent webinars to World Space Week events.



ASIA-PACIFIC

- The AP-SGOW 2021 was held online in December 2021 as an official side event of the 27th APRSAF (Asia-Pacific Regional Space Agency Forum).
- Multiple areas of cooperation were established with the Philippines Space Agency (PhilSA), the newest space agency in the AP region, including: drafting of the SGAC-PhilSA MOU, SpiSEA episodes, AP-SGOW partnerships, World Space Week event, logo competition, and a poster competition.
- The Space in South East Asia (SpiSEA; pronounced “spicy”) webinar series was completed. It had a total of five episodes spanning 8 months (March, June, July, August, October).
- SGAC’s AP region spin-off from the 2020 AP-SGOW, the Asia Pacific Oceania Space Association, recorded many online gatherings (“Space Smurfs” talks and podcasts), Cosmic Sandbox workshops, and representations at conferences (UN ESCAP ICC-RESAP, IAC 2021, APRSAF-27 SPLWG session).
- The first SGAC local event in Indonesia was successfully held. It was a webinar titled Indonesia’s Space Activities: Its Development and Rise of Indonesian Space Age Millennials and was supported by the National Institute of Aeronautics and Space (LAPAN).



NORTH, CENTRAL AMERICA AND THE CARIBBEAN

- Many virtual and in-person activities were held in multiple countries throughout the year. Some notable events included: What Space Can Do for WI Video Series (multi-country collaboration), Speaker of the Months Series in El Salvador and Nicaragua, 3rd Introduction to Space Engineering (Collaboration from El Salvador, Panama, Nicaragua, and Costa Rica).
- A Letter of Intent with the American Society for Gravitational and Space Research was established. There are many ongoing discussions for MoU and Lol establishment for early 2022. An informal partnership with SEDS-Canada and Zenith Canada Fellowship Program through webinar series and panels was continued in 2021.
- Team and planning began in late 2021 for the NCAC regional workshop in mid 2022 at Texas.
- Our regional leadership received several awards, including: 6 Emerging Space Leaders, 1 Young Space Leader, 1 Space Generation Leadership Award, 1 SGAC Pioneer Award. This led to a large participation from NCAC leadership in the IAC in Dubai and SGFF.
- There was a large participation in the World Space Week online activities from Trinidad and Tobago and Mexico.



EUROPE

- The 5th E-SGW was conducted in an online mode on 28th May, 29th May and 5th June 2021. The theme of the workshop was “Space for Earth and Humanity”.
- The 3rd Italian Space Startup Competition (ISSC) was organised in November 2021 in Milano, Italy.
- NPoCs from many countries in the region organised online activities for networking and knowledge sharing, such as webinars on space, throughout the year.
- The ‘postcards to space’ initiative was launched by Slovakian NPoCs, supported by the Slovak Space Office.
- A Regional Communications Manager and a Regional Secretary were recruited for the Europe regional team.

Appointments

34
Vacancies Posted

379
Applications Received

134
Members Recruited

SGAC is pleased to have appointed the following new staff members in 2021:

**Imane El
Khintouti,**
Morocco

**Commercial
Space PG
Co-lead**

**Phylis
Makurunje,**
Zimbabwe

**Executive
Secretary**

Charlotte Flory,
France

**Local Events
Coordinator**

Lucille Baudet,
France

**Events Team
Member**

**Kristine Jane
Atienza,**
Philippines

**Executive
Secretary**

**Joshua
Critchley-
Marrows,**
Australia

**Project Group
Coordinator**

Giuliana Rotola,
Italy

**Space Law and
Policy Project
Group Co-Lead**

**Chanud
Sithipreedanant,**
Thailand

**PR &
Communication
Team Member**

**Kelsey
Doerksen,**
USA

**Space
Generation
Congress 2021
Manager**

Nimisha Sharma,
India

**Events
Coordination
Team Member**

Ksenia Synkova,
Turkey

**Influencer
Partnerships
Coordinator**

**Ewerton De
Marchi,**
Brazil

**Reports Team
Co-Lead**

Hristina Talkova,
Austria

**Executive
Secretary Team
Member**

**Dhanisha
Sateesh,**
India

Reports Editor

**Mohaddese
Daryabari,**
Iran

**Events
Coordination
Team Member**

Rachel Venn,
UK

Reports Editor

Sakari Teerikoski, Sweden Project Group Coordination Team Member	Nikita Divay, India Reports Designer	Deepti Pattabhi, USA Reports Editor	Eleni Charitonos, UK Reports Designer
Leah Farrar, USA Alumni Co-Lead	Kristi Ray, USA Space Medicine and Life Sciences Co-Lead	Neda Senturk, Turkey Middle-East Regional Communications Manager	Manuel Ntumba, Congo & Togo Regional Partnerships Manager for Africa
Krittanon Sirorattanakul, USA Space Technology for Earth Applications Co-Lead	Aashee Aziz, Canada HR Onboarding Team Member	Soukaina Tachfouti, Morocco HR Membership Team Member	Selene Canelli, Italy HR Co-Coordinator
Leonard De Guzman, Australia HR Recruitment Team Member	Shabnam Yazdani, Iran Regional Partnership Manager for the Middle East	Sahba El-Shawa, Jordan Ethics & Human Rights Co-Lead	Eleni Ravanis, USA Ethics & Human Rights Co-Lead
Thea Flem, Belgium Space and Cybersecurity Co-Lead	Ayla Wolf, Germany Regional Communications Manager for Europe	Simona Richard, Italy Regional Secretary for Europe	Bryan Ho, USA Web and Data Team Member

Franz Raymond Bala, Philippines Web and Data Team Member	Anushka Koshy, India Web and Data Team Member	Megha Choudhary, India HR Onboarding Team Member	Caterina Gallo, Italy Space Medicine and Life Sciences Project Group Co-Lead
Katrin Dietmayer, Germany Alumni Team Member	Feven Markos Hunde, Ethiopia Alumni Team Member	Matteo Picconeri, Italy Alumni Team Member	Simon Shuham, USA SGFF 2022 Deputy Manager
Laura Manoliu, Germany Small Satellite Project Group Co-Lead	Andrea Abreu, Panamá 3rd NCAC SGW Organising Team Co-Event Manager	Bram De Winter, Netherlands Space Exploration Project Group Co-Lead	Daniel Seybold, Germany Treasurer
Oscar Lafuente Arjon, Netherlands Public Relations and Communications Team Member	Valeria Pinna, Italy Public Relations and Communications Team Member	Shriya Kapoor, India Public Relations and Communications Team Member	Logan Philbrick, USA Public Relations and Communications Team Member
Sunishka Sharma, India Public Relations and Communications Team Member	Laetitia Cesari Z, Luxembourg Space and Cyber Security Project Group Co-Lead	Bhavyashree Janardhana, Germany Alumni Team Member	Federica Angius, Italy Alumni Team Member

Suprabha Nambiar,
India

Alumni Team Member

Madison Diamond,
USA

Space Medicine and Life Sciences Project Group Vice Lead

Mark Rosenberg,
USA

Space Medicine and Life Sciences Project Group Vice Co-Lead

Allwell Edeji,
Nigeria

Graphics Designer

Cody Knipfer,
USA

SGx 2022 Deputy Manager

Mentoring Programme

The SGAC Mentoring Programme was created in 2018, following key recommendations at SGF 2.0 (Vienna) to foster development and support in the space sector through mentoring. SGAC created the mentorship program for its members in order to help connect SGAC members with experts in the space sector, especially through our vast network of SGAC Alumni. The mentorship program aims at connecting mentees and mentors in order to provide guidance, give personalised advice, and support to mentees from the different mentors.



In 2021, the SGAC Mentoring Programme continued to grow, connecting 162 new mentees with mentors in the space sector.

FINANCIAL SUMMARY

Revenue

€ 1,153,805.46

▲ +633.71%
Change from 2020

▲ +96.68%
without CFTF donation

Expenditure

€ 261,897.81

▲ +73.02%
Change from 2020

▲ +100.36%
without CFTF donation

Surplus / Loss

€ 892,041.46

▲ +14,775.91%
Change from 2020

▲ +2.51%
without CFTF donation

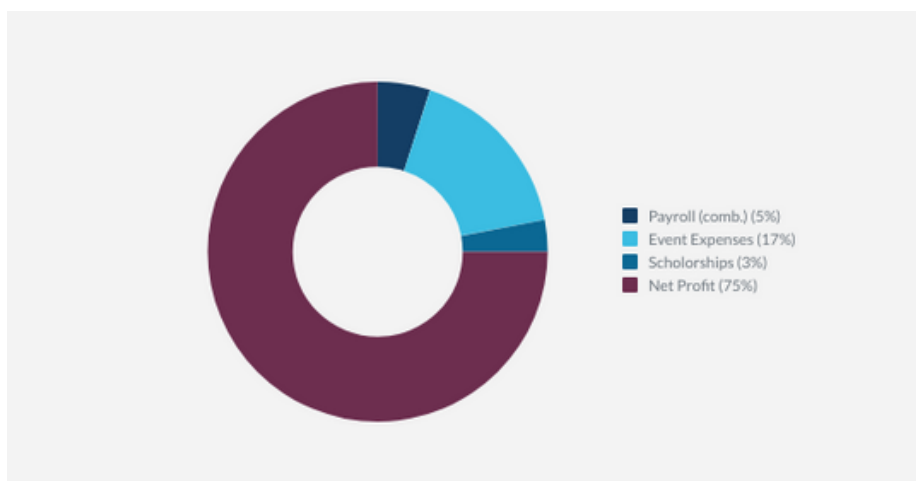
% Surplus / Loss

+77.31 %

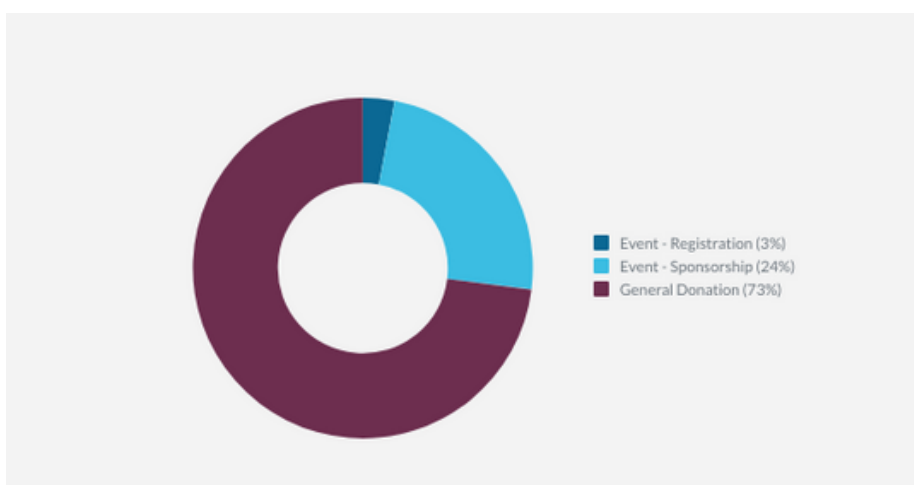
▲ +1.99 %

Change from 2020
without CFTF donation

Expense Distribution and Profit



Income Distribution



GLOBAL AND REGIONAL EVENTS



 7 September 2021

 Gaylord National Convention Center, National Harbor, MD, USA

SGx is an annual technology-focused event that brings together young professionals, industry experts and government leaders during the SATELLITE conference to discuss pressing issues and innovative ideas. Hosted by the Future Space Leaders Foundation, SGAC and Access Intelligence, this conference hosts hundreds of participants in or near Washington D.C., USA to engage in fast-paced and engaging discussions on cutting-edge space and satellite topics.

SGx2021 was the fifth annual SGx Talk Series held in partnership with Satellite 2021 and the Future Space Leaders Foundation. The schedule included a full day of talks on topics ranging from space business and marketing to space policy and reporting, with opportunities for networking between delegates.

Sponsors and Partners



Space Generation Congress

 21-23 October 2021

 Mohammed Bin Rashid University of Medicine and Health Sciences, University of Dubai, UAE

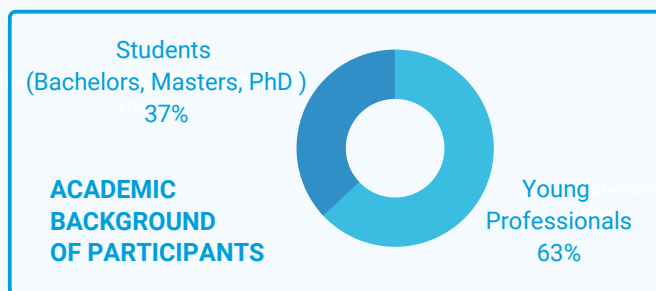
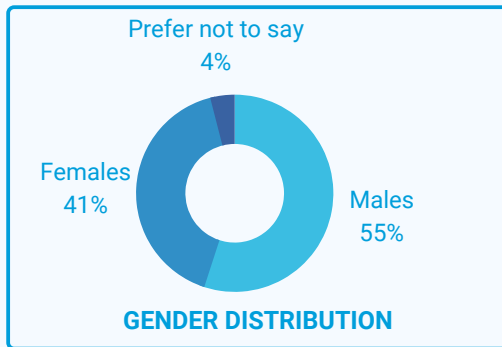
The Space Generation Congress (SGC) is SGAC's annual meeting in support of the United Nations (UN) Programme on Space Applications. Top university students and young professionals with a passion for space travelled from all around the globe to attend three days of the 19th SGC. 154 delegates enjoyed an inspiring and resourceful engagement with their peers at the congress, held in Dubai, on October 21 - 23 2021, prior to the 72nd International Astronautical Congress (IAC).

This year's session included panels focusing on SDG practices, with particular emphasis on space links to climate and environmental issues and increasing public awareness of these principles.





Statistics



NATIONALITIES	58
NUMBER OF DELEGATES IN PERSON	77
ONLINE	77
NUMBER OF WORKING GROUPS	6



Sponsors



Partners and Donors




ISS CREW FUND

KEN DAVIDIAN

CHRIS BOSHUIZEN

Space Generation Fusion Forum

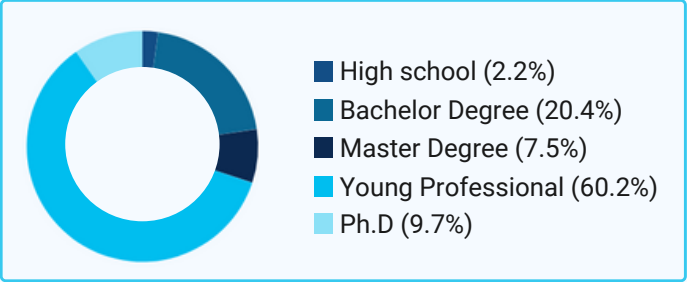
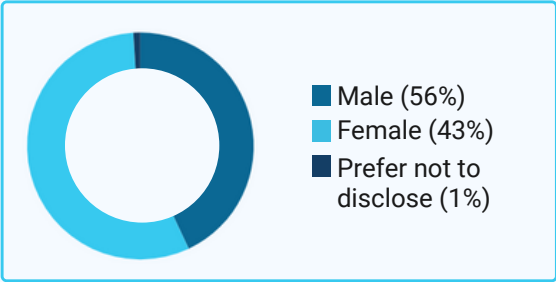
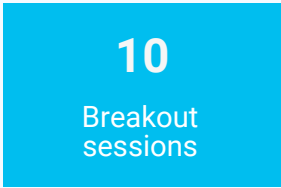
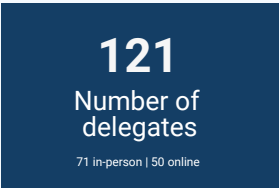
 21-23 August 2021

 Broadmoor Resort, Colorado Springs, Colorado, U.S.A

The Space Generation Fusion Forum (SGFF) 2021 was the latest edition of the annual Space Generation Fusion Forum, held in conjunction with the Space Symposium. SGFF 2021 included three days of in-person events, as well as a “virtual day” open to online delegates and streamed to the public on August 7th. The virtual day included introductions to breakout sessions and a virtual networking event. The in-person/streamed event included breakout sessions, lightning talks, keynotes, and other special dinner events.



Statistics



Sponsors



Partner



SPACE GENERATION WORKSHOPS



4th African Space Generation Workshop

25-26 September 2021

Accra, Ghana

The African Space Generation Workshop (AF-SGW) is a two-day regional workshop connecting students and young professionals with agency and industry representatives from across the African continent. It provides an unparalleled opportunity for the future leaders of Africa's space endeavours to proactively establish strong relationships, exchange ideas and knowledge, and to collaborate on brainstorming new ideas and solutions using space technology for the benefit of Africa.

Delayed from 2020, the 4th AF-SGW was held at the University of Ghana on the 25th and 26th September 2021 with the theme *"A United Africa for Space Innovation: A Step Towards Our Common Future"*. The event included workshops, speakers, and panels, along with five working groups.





5th European Space Generation Workshop

 28-29 May, 5 June 2021  Online

The European Space Generation Workshop (E-SGW) is an international event that aims to bring together students and young professionals to think and collectively create Europe's future in space.

The fifth edition of the European Space Generation Workshop was held online on the 28th May, 29th May, and 5th June 2021. Delegates got the opportunity to share ideas on sustainable space applications – a topic in which interest has substantially increased over the past few years.

Over the three days, students and young professionals discussed and shaped the future of space in Europe together. There were talks and panels by experts and professionals from the leading European companies and agencies, and working groups where the delegates discussed diverse space topics moderated by industry experts. It was a great opportunity for young space enthusiasts to learn about the latest space developments and discover opportunities in the space field. Space companies and agencies were interested to recognise talent and obtain insight on innovative ideas and the opinion of the next generation of space professionals.



5th African Space Generation Workshop

 26-27 November 2021  Hybrid / Stellenbosch, Western Cape, South Africa

The 5th African Space Generation Workshop (AF-SGW) was a two-day hybrid workshop which brought together students, young professionals, industry experts and government stakeholders from across the African continent. It provided an unparalleled opportunity for the future leaders of Africa's space sector to proactively establish strong relationships, exchange ideas and knowledge, and to collaborate on novel ways in which space technology could be utilised for the benefit of Africa.

The 5th AF-SGW was held as a hybrid event from the 26th to the 27th of November 2021 in Stellenbosch, South Africa. The theme for this workshop was 'Building a Self-Sustaining African Space Sector' and participants were divided into working groups (WGs), each focusing on a specific sub-theme broadly covering Technology, Entrepreneurship, Policy and Capacity Building.

The AF-SGW was held the weekend prior to the 1st IAA African Symposium on Small Satellites, which was held from the 29th of November to 2nd of December 2021 in Stellenbosch, South Africa.



Asia Pacific Space Generation Online Workshop



11-12, 18-19 December 2021



Online

An official side event of the



For the past seven years, SGAC has run annual Space Generation Workshops for the Asia-Pacific region, inviting local university students and young professionals to network, learn, and discuss space topics.

In 2021, due to the global health situation associated with COVID-19, the organising team conducted a second online edition of the AP-SGW. This followed the great success of the previous year's Asia-Pacific Space Generation Online Workshop, which gathered more than 75 delegates to discuss diverse space topics moderated by experts.

AP-SGOW 2021 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 home. Furthermore, as a uniquely online experience, AP-SGOW 2021 included Workshops, Virtual Coffee Hours, an International Night and many other fun activities.



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/April). As one of the permanent observers in UN COPUOS, SGAC contributes to the activities and action teams of UN COPUOS.

Over the course of the year, SGAC has continued to support the UN by actively participating at the UN COPUOS meetings, and other events by the UNOOSA. In February 2021, the UNOOSA and SGAC continued to work jointly in supporting young people in line with the Secretary General's Youth 2030 strategy, launched in September 2018. Together, they have delivered the 3rd edition of 'Space for Youth' Competition aimed at engaging youth in the discussion of how space science and technology can be relevant on the topic of Climate Change. The competition invited participants to submit examples in their communities and to amplify the voice of the youth in space policy-making by issuing the winning entries to the UN COPUOS.



UN COPUOS Scientific and Technical Subcommittee

SGAC participated in the 58th session of the UN COPUOS Scientific and Technical Subcommittee on 27th April 2021. Davide Petrillo, SGAC's Executive Director, presented on the recent activities of SGAC, of which the following were highlights:

- More than 120 webinars were conducted by SGAC members with a total attendance of more than 11,000 people connected from more than 130 countries, promoting idea-sharing in an international context.
- SpaceGen United, organised in 2020, was SGAC's first online Global Congress. 143 delegates from 53 different countries joined together for a dynamic and engaging, nine-day programme which hosted 14 hours of keynote speeches. In addition, the NextGen Summit was hosted in collaboration with IAF and ISEB to bring a platform for the next generation providing inspiring opportunities and advice through a dedicated 4-hour live session with more than 40 speakers, of which 70% were women.
- The SpaceGen Summit was also held and was designed to provide a comprehensive and diverse programme that brought to the forefront pertinent topics across the current global space industry.
- SGAC has also 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.
- 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.
- A second full-time employee was recruited in 2021 to help support the Executive Director and different teams in their work. Ms. Valentina Luchetti was appointed in April 2021 as the Operations Manager of SGAC
- SGAC has secured 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 the past year.

Additionally, during the two-week meeting, SGAC members made two Technical Presentations in an online mode. Rochelle Velho, the Space Medicine & Life Sciences Project Group Co-Lead presented An evaluation of Earth Observation as a potential tool to forecast and manage resources during the Covid-19 pandemic and José Pedro Ferreira, the Commercial Space Project Group Co-Lead presented the topic The Commercial Space Industry in Africa and its Readiness for Innovation-Driven Investment: The Space Generation's View.

UN COPUOS Legal Subcommittee

This was the 60th UN COPUOS Legal Subcommittee session and SGAC presented its activities with regards to space law and policy. Davide Petrillo, the Executive Director made a statement on behalf of SGAC on 3rd June 2021 and some of the highlights are given below:

- The SGAC Taskforce on United States Space Policy was established in January 2021 to educate members of US congress and staffers on key contemporary policy items.
- SGAC is supporting the development of space law and policy infrastructure on the African continent, by drafting the first space policy for the Republic of Uganda that is now under governmental review. Seminars in Singapore were also organised to educate its national space industry and legal professionals on practical aspects of licensing, authorisation and supervision in the absence of domestic space legislation. SGAC is also keen to extend support to other countries in similar ways.
- SGAC Space Law and Policy Project Group is surveying stakeholders globally to understand and advance the justiciable use of remote sensing data in the interests and for the benefit of all humankind.
- Space Safety and Sustainability Project Group, and the Space Law and Policy Project Group launched a collaboration to investigate the impact of satellite constellations on ground and space activities. The desired outcome is to highlight the benefits satellite constellations could bring humanity, and identify recommendations mitigating their potential risks, to contribute to ongoing discussions on protecting dark and quiet skies.
- A Lunar Governance Report was adopted outlining the ideas and proposals of the young generations for the regulation of lunar activities. This Report has been drafted by a dedicated Team called E.A.G.L.E. (Effective and Adaptive Governance for a Lunar Ecosystem): a globally diverse, interdisciplinary group of 14 young space professionals established by SGAC in June 2020. Over the course of a year, the EAGLE Team interviewed 29 experts from the global space community and studied the legal and policy landscape for lunar activities, to develop a thorough understanding of the status quo and make an informed proposal for the way forward.

Furthermore, two online technical presentations were made by SGAC delegates. Yuk Chi Chan, a Space Law and Policy PG Member presented the [SGAC Report on the LTS Guidelines National Implementation](#) and Antonino Salmeri, the EAGLE Team Coordinator presented [Effective and Adaptive Governance for a Lunar Ecosystem \(E.A.G.L.E.\). A Proposal for a Lunar Governance Charter from the Young Generations at the United Nations.](#)

COPUOS General Assembly

The 64th COPUOS General Assembly was attended in person by Valentina Luchetti, the Operations Manager of SGAC, who delivered a statement on the behalf of SGAC on 1 September 2021. Here are some highlights from the above:

- 9th annual Space Generation Fusion Forum was held in conjunction with the 36th Space Symposium, in Colorado Springs, USA in a hybrid format with a total of 135 attendees, of which 85 in-person and 50 online, students and young professionals from 26 different countries, along with 50 speakers.
- SGC 2021 conducted in a hybrid format with 80 delegates attending in-person, amongst which 40 are scholarship winners, and 70 delegates attending online.
- At the beginning of July, SGAC and 18 other space related non-profit charitable organisations were selected to receive a \$1 million grant from Blue Origin's Club for the Future.

The technical presentations were headed by Yulia Akisheva, the Diversity and Gender Equality Project Group Co-Lead and Victoria Carter-Cortez, the SGC Deputy Manager, presenting online about the next generation's recommendations and call for action for gender equality and diversity in the space sector, the Space Generation Congress and SpaceGen United respectively.

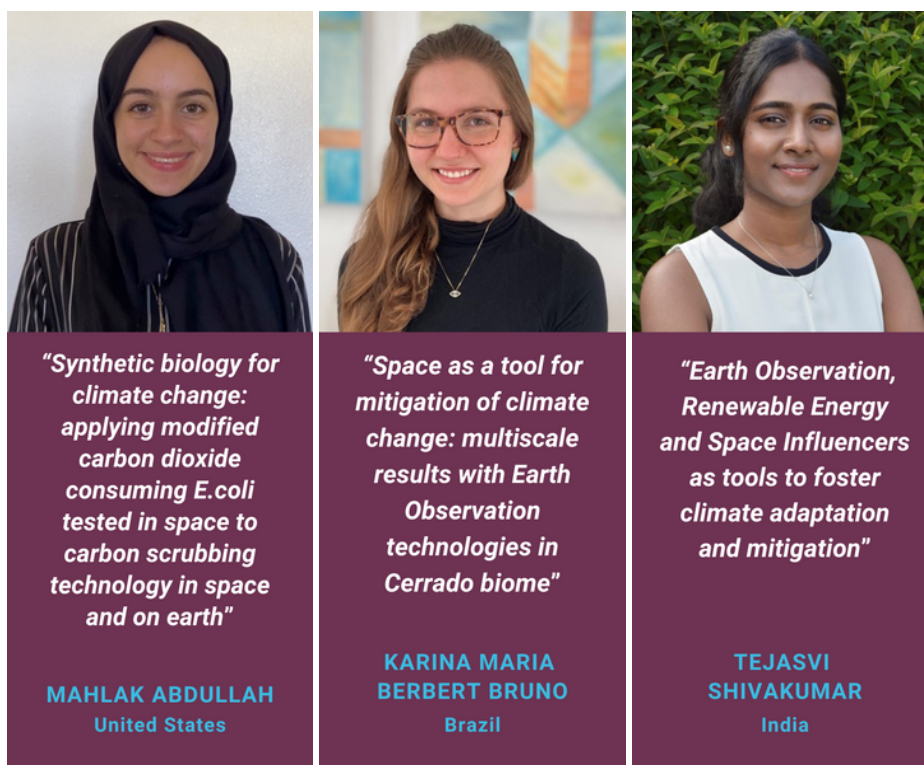
Space4Youth Competition

The United Nations Office for Outer Space Affairs, in collaboration with the Space Generation Advisory Council, launched the 2021 edition of the Space4Youth Competition. The theme of this year's competition was climate change, with a focus on Climate Action, the 13th UN Sustainable Development Goal. The title of the competition was **Youth4Climate 2021: Space as a tool to foster climate mitigation and adaptation**

Climate change is the defining issue of our time and young people play a key role. UNOOSA and SGAC wanted to give a voice to and promote youth's ideas on how space can foster climate adaptation and mitigation.

The three winners of the competition were women representing the United States, Brazil and India. Five further *special mentions* were also awarded. The participants of the competition represented 68 countries, covering all regions across the globe. The majority of participants were women, who made up 54% of all entrants and awardees.

Winners



Special mentions

Bryan Novio, Philippines: " **Space as a Tool for Climate-Smart Management of Insect Pests in Food Crops**"

Komal Sajwan, India: " **Space as tool to foster climate change adaptation and mitigation**"

Sivanuajan Suthaharan, Sri Lanka: " **Space for Sri Lankan paddy rice cultivation**"

Denzil Rajack Prayag, Trinidad and Tobago: " **Enactment of radar imagery for oil spill detection in Trinidad**"

Onyinye Nwankwo, Nigeria: " **Space as a tool to foster climate mitigation and adaptation: Using the Amazon RainForest region of Brazil as a case study**"

Elliott Wobler, United States: " **Space as a Tool to Foster Global Climate Change Mitigation and Adaptation**"

PROJECT GROUPS AND ACTIVITIES

Commercial Space



Scope and Objectives

The Commercial Space Project Group understands itself as a forum and think tank on the vibrant commercialisation of space activities for members of the Space Generation Advisory Council. The group's research interests lay in:

- 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

- **Space Business in Developing Countries:** A project to identify key factors that attract foreign investment to new space-faring countries and disseminate conclusions to encourage such development in emerging and developing countries.
- **Commercial Space Resources Activities:** Address the economic challenges of space mining using specific case studies on different celestial bodies to promote well-balanced regulation for commercial space resource exploitation activities.
- **Think Tank:** In an idea-accelerator scheme, push the brainstorming of new space business and technical ideas for current and future problems to encourage the entrepreneurial spirit within SGAC.

Space Exploration



Scope and Objectives

The 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:

- Development of exploration technologies and capabilities
- Safety enhancement
- Performance of space
- Earth and applied science
- Search for life
- Stimulation of economic expansion

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

Initiatives

As space agencies and private space companies seek new mission design concepts that challenge and advance our technological and scientific knowledge, our research team strives to support the space community with original and innovative mission designs.

Stemming out of ACHIEVED, we have created two year-long mission design teams:

- **HOPE** – *High-technology Operations for Planetary Exploration*: Examining a deep space CubeSat-based mission that provides flexibility, affordability, and lower risk than traditional single-spacecraft missions. The outcome is a technology demonstration mission to study Uranus and its moons with a main orbiter carrying several CubeSats as its payload.
- **RAISE** – *Research Assembly for Innovative projects in Space Exploration*: Investigating an innovative approach to a Mercury sample return mission. The science collected from this mission contributes to understanding how Mercury formed and potentially how our own Moon formed.

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 pursues projects relevant to the field of space law and policy and to the broader international space community.

Initiatives

The Space Law and Policy Project Group has identified the following goals:

- Engage in critical debates about actual legal and policy aspects concerning space activities
- Investigate legal and regulatory challenges faced by the space community
- Propose space-related policy recommendations
- Address potentially emerging questions and issues in the space sector
- Develop research papers regarding trend questions and issues of the space community
- To contribute and collaborate with the space community on multidisciplinary topics

The working group aims to partner creatively and collaboratively with other civil society institutions, such as the International Institute of Space Law, and to derive synergies from the vast global network of space academics and professionals.

Ethics and Human Rights



Scope and Objectives

The vision of the Ethics and Human Rights project group is to identify how space technology can best contribute to the realisation of the United Nations objectives on Human Rights and the Sustainable Development Goals. At the same time, the project group is a platform for empowerment and justice from the perspective of the diverse peoples who make up the modern space sector in order to help shape its development to be representative of all humanity.

Initiatives

- **Membership Survey and Summary Report:** The project group will conduct a survey of SGAC membership perspectives and priorities on issues of ethics and human rights in the space sector. The anonymous online survey will be available to all SGAC membership. The survey focuses on experiences in the space sector and diversity.
- **The Ethics and Human Rights in the Space Sector Reading List and Website:** this project will leverage the PG's expertise to develop a reading list of high-quality materials which engage questions of ethics and human rights and their intersection with space and space technology, as well as work in space or space-adjacent fields which address diversity from a critical and inclusive intersectional approach to gender, race, class, ability, sexuality and other components of oppressed identities.
- The reading list will be made publicly available to all space advocates interested in the intersection of space and ethics in the 21st century.

Small Satellites



Scope and Objectives

Small satellite programs are particularly attractive since they are “affordable”. There shall be no surprises in the near future if more and more developing countries, groups from the academic world or even small teams of space enthusiasts develop their own space mission based on small satellites. The small satellite platform is catering to new actors such as developing countries, students, and amateurs. In recognising the changing landscape of space exploration using small satellites, SGAC initiated the Small Satellite Project Group.

Initiatives

- A Feasibility Study For Project Giga: Using Satellite Constellations To Provide Internet To Disconnected Schools:** This paper will analyse the growth of interest in the small satellite communications sector and offer a background on current technology providers. A feasibility study is performed to assess the main actors in the field and their ability to contribute to Project GIGA’s ultimate goal of connectivity for every school. The paper identifies the benefits and potential obstacles of constellation-based satellite broadband internet. Where necessary, possible solutions and workarounds are explored to allow a coherent assessment on the practicality of Project GIGA’s connectivity objective. With this research, Project GIGA will have a baseline to begin outreach and development initiatives.
- Machine Learning for Earth Observation Small Satellites: A Review:** This project’s aim is to act as a bridge between the Earth Observation small satellite community and the machine learning community, highlighting potential opportunities. The PG will develop a State-of-the-Art review exploring all on-board and off-board applications of Machine Learning to Earth Observation outside of image processing on ground.
- Mission Design for In-Orbit Demonstration of Active Debris Removal through an Ion Beam Shepherd Small Satellite:** This project explores the technological challenges of one of the mission concepts for active debris removal, the Ion Beam Shepherd, and proposes strategies and the required steps to propose a demonstration mission. An overview of the different approaches is provided, analysing the current architectures and technologies.
- A Review of Near Future Optical Technology for High-Speed and Secure CubeSat Communications:** This project follows the current technological readiness of laser communications systems and their integration into small satellites.

Near Earth Objects



Scope and Objectives

The Near Earth Object (NEO) Project Group is dedicated to helping the worldwide planetary defence community to meet one of nature's greatest challenges. The group provides a youth perspective to planetary defence through annual reports, competitions, conference attendance, and public outreach projects related to Near Earth Objects.

Initiatives

- **Find an Asteroid Campaign:** The PG celebrated International Asteroid Day 2021 through its social media pages on Facebook, Twitter and organised its annual 'Find An Asteroid (FAA)' 2021 campaign until November 26, 2021. The PG aims to recruit more new active members to start new projects in 2022 including submitting a paper for IAC 2022 and continue the annual MAA competition, NEO Renaissance poster competition and FAA campaign in 2022.

Space and Cybersecurity



Scope and Objectives

This Project Group follows the outcomes of the Space & Cybersecurity working group at the European Space Generation Workshop (ESGW) 2018, hosted in Bucharest, to emphasise the need to reflect on the nature of space and cybersecurity, what the priorities of governments and international institution should be, whether data should remain open source or limited in its availability, possible technical solutions to the challenges posed above, and the shape and origin of threats to cybersecurity in space.

Initiatives

- **Decoding Cyberspace:** A podcast interviewing leading experts and industry professionals operating in the intersection between ICT and outer space.
- **International Forum:** A forum where members can share their thoughts, views and opinion on international space policy issues, and raise awareness among the next generation of space professionals about the global scale of space activities. In addition, the group wants to spread these discussions by creating a presentation that can set the basis for members to do cybersecurity presentations around the world themselves.

Space Safety and Sustainability



Scope and Objectives

The space environment is an international domain and requires collaborative efforts from all space-faring nations to ensure the safety and sustainability of this environment. It is therefore essential that there is a wider awareness of an international culture of space safety and sustainability among the space community. The Space Safety and Sustainability Project Group will assist 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

- **SSS Essay Competition:** After two successful editions of the SSS Essay Competition this initiative has been made annual. A third edition shall be launched early in 2022. The PG will host a competition on subjects related to SSS goals: space safety and sustainability of outer space activities.
- **Environmental Impacts of Space Activities:** Space-based environmental monitoring services are making great efforts to curb climate change and provide societies with the means to respond to these global threats and support decision-making. While comprehensive studies on the benefits of space activities on the environment are numerous, it is important to identify, quantify, and reduce its negative impacts. This project consists of drawing up a report on the global outlook on the environmental impacts of space activities and on the associated challenges and solutions.

Space Medicine and Life Sciences



Scope and Objectives

The Space Medicine and Life Sciences (SMLS) Project Group aims to provide 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; to optimise human health on Earth, low-Earth orbit and beyond. Moreover, we hope to incubate and support ideas from the next generation to solve today's health challenges.

Initiatives

- **Systematic Review Workshop:** Connecting individuals with mentors working on systematic reviews in space medicine and life sciences to join their projects.
- **Health in Space Webinar:** A continued webinar discussing space health topics. Each webinar episode 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. Through this webinar series, we hope to expose students and budding young professionals to the variety of opportunities in the field, and to inspire them to pursue a space or STEM related career.

Space Technologies for Earth Applications



Scope and Objectives

The Space Technology for Earth Applications project group was founded in 2019 to address the intersection of space-based technologies and sustainable development by giving students and young professionals from all over the world equal access to hands-on experiences as well as a professional network. Their activities focus on a variety of societal challenges including climate change adaptation, disaster management, environmental monitoring, urban planning and pollution mapping. In collaborative project work and capacity-building efforts with local partners, we utilise the immense potential of space technology and apply innovative analysis methods such as deep learning to extract actionable information and to support non-trivial decision-making.

Initiatives

- **REFRA-SOS:** Global weather-related disasters are now estimated to account for 90% of all disasters. These will likely increase in severity and frequency with current and forecasted global climate changes, and disaster mitigation is extremely challenging in areas with socio-economic limitations. This project aims to develop a feasible, economical, open-source software package for flood management in developing countries by the integration of data from social media crowdsourcing (e.g. Twitter, Flickr), optical satellite imagery, and synthetic aperture radar (SAR). The project will also host annual workshops for local partners in Cameroon to transfer the knowledge gained from this work.
- **AIOFAR:** The aim of AIOFAR is to improve ocean farming performance by studying the feasibility of farms based on the location and respective threats such as harmful algal blooms, ocean acidification and harsh weather conditions. This objective is achieved by analysing several sources of input data: multispectral images and marine data parameters from the European Union (EU) Copernicus program, positioning information from Global Navigation Satellite Systems (GNSS), in-situ data obtained through deployed Internet of Things (IoT) devices, and feasibility databases from specialised organisations.
- This data is evaluated using artificial intelligence and other advanced processing techniques. This concept has been awarded the 3rd place prize by the Farming by Satellite program 2020, a joint initiative of the EU Agency for the Space Programme and the European Environment Agency that rewards young innovators exploring the use of data from the European space programmes Galileo, European Geostationary Navigation Overlay Service (EGNOS), and Copernicus to improve agriculture and reduce environmental impact.

- **GEO4Schools:** An educational programme which aims to communicate the importance of geographic information systems (GIS) together with earth observation (EO) data for society. Consisting of eight lessons for pupils aged between 12-14 years, it communicates basics of GIS tools and EO data analysis and concludes with a challenge to assess their community problems based on the new learned techniques and methodologies. GEO4Schools fosters the development of critical-thinking, problem solving and communication and opens up the door to exciting careers in conservation and environmental protection, town planning, as well as diplomacy, tourism or teaching. SGAC answered Michael Hughes' call, Assistant Head Teacher at Ellesmere Port Catholic High School, Cheshire, UK, to engage the Geospatial and Earth Observation sectors into enabling his young students to understand and see the real-life applications of Earth Observation and GIS data.
- **Supplementing EO with Twitter data to improve disaster assessments: a case study of the 2020 Bobcat fire in California:** Space-based Earth Observation allows us to simultaneously detect changes on Earth's surfaces over a large area. As a result, it is often used to assist with disaster assessments to understand associated property damages in the affected areas. In recent years, the use of social media, such as Twitter, has been proven to be useful in providing supplemental information for emergency situations. This study aims to demonstrate the benefits of supplementing Earth observations with Twitter data in disaster management by using a recent fire in Southern California as a case study. This Bobcat fire started on September 6, 2020 and burned for over 3 months. The plume from the fire spanned more than 1,000 miles with smoke travelling across the entire North American continent. 115,000 acres of land got affected along with unprecedented wildlife loss. Available remotely sensed data allows us to understand pre- and post-fire conditions of the land. Geotagged tweets are analysed and compared with levels of pollutants measured from ground instrumentations and the smoke coverage seen from satellite imagery.
- The addition of Twitter data allows us to derive a more holistic view of the impacts of the Bobcat fire, including physical and emotional state as an aftermath of the fire. With better understanding of social media utilisation, we would be able to develop a better risk reduction tool that could be used for the purposes of early warning of disaster events and reducing mental stresses after a disastrous event.
- **Diversity in the Space Industry:** In the modern era, developments in transportation and online communication platforms reduce barriers and allow citizens of this world to connect with one another. While many efforts have been utilised over the past few years to improve diversity in various fields, there are a limited number of available studies that track our progress toward a more inclusive community. In our definition, diversity is not limited to only genders and races, but also includes ages, nationalities, and educational backgrounds. Our project aims to contribute further to this area by analysing the current state of diversity in the space industry by utilising available data including SGAC memberships, IAC conference participations, and co-authors in peer-reviewed publications. We plan to compile aggregate statistics of the current state of diversity in the space industry, and when possible, also track how these statistics have evolved over the past decades. Moreover, we also plan to utilise data from Twitter in a sentimental analysis based on natural language processing of the texts in the tweets to analyse the emotional responses of the public on recent efforts aiming to improve diversity. We also plan to extend our project in the future to include a development of recommended best practices on improving diversity for different organisations from different sectors.

Diversity and Gender Equality



Scope and Objectives

The Diversity and Gender Equality Project Group works on the topics of diversity, inclusion, and equality within the aerospace sector and contributes to answering the following Sustainable Development Goals: SDG #4 Quality Education, SDG #5 Gender Equality, SDG #8 Decent Work and Economic Growth and SDG #10 Reduced Inequalities. This Project Group started its work under the Our Giant Leap initiative in 2019.

Initiatives

- The Project Group is highly invested in communication and outreach online. Various channels and formats (e.g. the annual Our Giant Leap Magazine, a youtube playlist with Masterclasses, educational videos and webinars, reports, infographics, etc.) are available. The team hosts an online platform (Slack) to gather information and ideas from SGAC members, alumni and interested partners from all over the world, effectively inviting representatives of all generations to start a dialogue with the next space generation about diversity and gender equality issues.
- **The DIVINAS** project aims to support the diversity in future generations of astronauts. The group collaborates with experts to help people prepare their candidatures, and engage in extensive communication to reach out to the underrepresented groups among the applicants. They believe that gender and geographical diversity can and shall be increased among the astronaut candidates both from the public and private sectors.
- The **FIGURES** project supports the first women that will travel to Mars. Concretely, it aims to fill the gap in female-oriented research in human spaceflight through field research and analog experiments. They believe that more female-oriented research and a sex-disaggregating protocol should be applied to all analog missions to address gender diversity among astronaut and analog astronaut cohorts.
- The **PADAWANS** project is concerned with outreach and education of the youngest space generation. The group collaborates with teachers, educators and parents to reach out to school pupils in order to introduce them to various professions in the space sector. They believe that shared experiences between space professionals, students, their parents and teachers build a bridge between curiosity and opportunity for the children and their future.



SPACE GENERATION
ADVISORY COUNCIL

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