CIT CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

INTERNATIONAL® SPACE UNIVERSITY

2017 RETROSPECTIVE

INTERNATIONAL SPACE UNIVERSITY

SSP17 RETROSPECTIVE

Very few universities possess a spirit as innovative and visionary as the International Space University (ISU). As its name conveys, two of the underlying tenets of the university are its international spirit and specialization in space. Established in 1987 at a founding conference at the Massachusetts Institute of Technology (MIT), ISU has since become the world's leading institution in the specialized fields of the space sector.

ISU offers a unique brand of space education that is sought after by space agencies, the private sector and research institutions worldwide. True to its founding principles, the education at ISU revolves around the three "I"s —International, Interdisciplinary, and Intercultural. Over the past 30 years, more than 4,400 students from over 100 countries have graduated from ISU.

SPACE STUDIES PROGRAM (SSP)

ISU offers several programs targeted at different demographics, from short term executive programs to a one- or two-year Master's program. The Space Studies Program (SSP), though, is the long-standing, pioneer program of the university. It is a graduate level professional development program conducted by ISU since 1988. The curriculum covers principal space related fields that are both technical and non-technical. The program itself covers a range of subjects from policy and law, to business and management, humanities, life sciences, engineering, human and physical sciences, space applications. The shared experience of an international, intensive, and interactive working environment is an ideal networking forum leading to the creation of an extensive, international, multidisciplinary professional network.

SSP takes place in a new location every year. Exploring a new host country brings an added dimension to SSP's internationally-oriented education. The host country's unique resources and expertise contributes positively to the learning environment. That is why SSP is a good fit for anyone with a passion for and interest in all things space and is interested in joining the workforce within the space sector.

The International Space University was pleased to bring its Space Studies Program—for the first time—to Cork, Ireland. At the Cork Institute of Technology, we experienced the warm Irish hospitality and excellent academic facilities. Along with Ireland's high interest in all things space related, it was the excellent organizing host team that helped win the hearts of the participants for nine weeks leaving all with fond memories of the nine weeks when they called Cork home.

A PROUD HISTORY

1987: ISU founding conference & incorporation in USA

1988: First summer session at MIT in Cambridge, Massachusetts

1994: ISU relocates to Strasbourg and incorporates in Alsace

1995: First Master's Program of Science in Space Studies (MSS)

2011: Beginning of the Southern Hemisphere Space Studies Program

2017: SSP17 held in Cork, Ireland—the first SSP in Ireland

ISU CENTRAL CAMPUS
STRASBOURG, FRANCE

SSP17 HOST INSTITUTION

CIT CAMPUS
CORK INSTITUTE
OF TECHNOLOGY
CORK, IRELAND

FACULTY AND STAFF

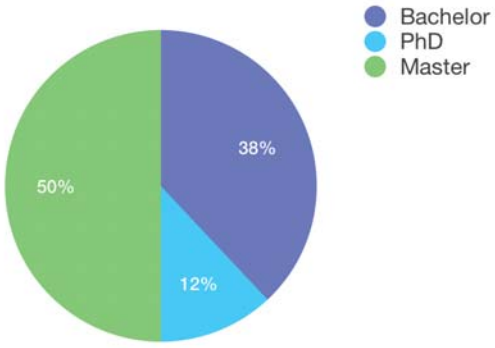
The Space Studies Program invites approximately 225 top experts from around the globe to share their professional knowledge with the participants. From astronauts to space agency leads, scientists, engineers, filmmakers, storytellers, artists, entrepreneurs, private industry, and non-profit pioneers, these lecturers are the leading experts in their fields. This year's SSP faculty and distinguished lecturers included astronaut Jeffrey Hoffman, political and space historian John Logsdon, astronaut Robert Thirsk, Chairman for the Breakthrough Prize Foundation Simon Pete Worden, Former Deputy Administrator of NASA Dava Newman, Canadian astronomer Dr. David Levy, and Mikhail Marov from the Russian Academy of Sciences.

PARTICIPANTS

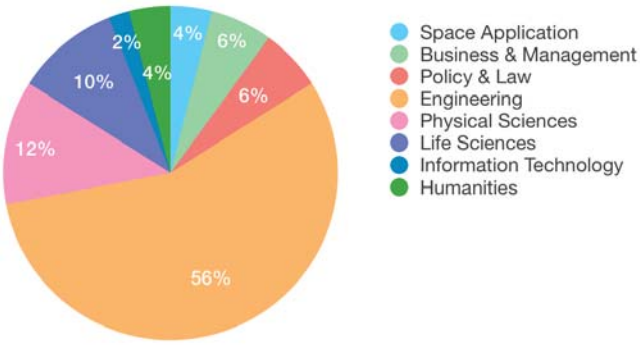
This year's participants were a diverse group; with 26 countries at SSP17. Most of them came with an educational background in engineering and 6% of the participants had PhDs in their respective field.

Other educational fields like business, science and social sciences were strongly represented.

Educational Level



Educational Background



I had such a positive and rewarding experience as a participant in SSP16, that I decided I would come back to help out as Participant Liaison during SSP17 in Cork, Ireland!

My time at SSP17 has been such an amazing experience, and I feel fortunate that I was able to work with so many wonderful people! It's incredible how much we all have in common and the amount of similar interests we all share. That has helped make it easier to connect with everyone.

What I really enjoyed is that everyone here brings their own unique energy to the group! This year has been a joy from start to finish and I am really looking forward to furthering my career thanks to the ISU Space Studies Program!

Hannah Petersson
Sweden
SSP17 Participant Liaison

WHAT DO PARTICIPANTS GAIN FROM SSP?

International exposure: SSP offers participants the opportunity to meet with the space industry's top experts, leading scientists and administrators from space agencies, private companies, nonprofits and research institutions from around the globe. While this gives them unprecedented access and exposure like no other, participants also gain a personal connection with the space industry's world leaders.

International, interdisciplinary teams: SSP groups and teams combine participants from all national, professional, and educational backgrounds to develop the skills required to work in global teams. Bringing together these diverse perspectives creates a rich environment in which peers can learn from one another to accomplish common goals.

Knowledge in all fields of the space sector: For nine weeks, participants are exposed to all major fields in the space sector, including engineering, science, applications, policy, economics, law, management, business, arts, and life sciences.

Cultural exchange: Living and working with fellow participants from around the globe provides everyone an appreciation of different cultures, which is critical in today's industry - dependent on international cooperation.

Networking for life: The SSP experience doesn't stop after SSP ends. Years, decades after their SSP, participants acquire a wealth of opportunity through a network of alumni scattered all across the globe. This gives the SSP participants better opportunities within the space sector.

SSP CLASS OF 2017

Back in 2011, my sister attended SSP11 in Graz, Austria. I saw the great benefits that she gained from the program and from that, I knew that becoming a participant was right for me. This year, I decided that SSP17 was my turn to participate. I instantly enjoyed SSP17 from the start and the excitement continued throughout the program. I not only gained practical experience, but I also met some incredibly interesting people from all around the world. As a participant for the Human Performance in Space department, I tried things I never thought I would. From free falling in the rescue life boat at the National Maritime College of Ireland, to learning life-saving techniques that astronauts use on the International Space Station, and even figuring out triage for a simulated crash on Mars; I learned so much while still having loads of fun. SSP17 has been such a rewarding experience for me and it sincerely changed my life.

Lisa Drudi
Canada
SSP17 Participant

CURRICULUM

The interdisciplinary SSP curriculum emphasizes international cooperation and provides participants with varied perspectives on the world's space activities; perspectives that are normally reserved for those with years of diverse professional experience. The program includes a wide variety of activities, lectures by renowned experts, hands-on activities and projects, teamwork exercises, and professional visits. Each year it evolves to better meet the needs of its students and their employers.

There are three phases to SSP: Core Lectures, Department Activities, and Team Project. Throughout the course, participants are encouraged to contribute their own ideas, knowledge, and enthusiasm, while—in accordance with ISU's philosophy—being open to and learning from others' unique perspectives. All course work at ISU is conducted in English.

CORE LECTURES

During the Core Lecture weeks, fifty-six lectures were given by experts of different backgrounds from all over the world. The lectures covered the fundamentals of all major topics of space and focused on Applications (APP); Engineering (ENG); Management and Business (MGB), Policy, Economics, and Law (PEL); Sciences (SCI); Humanities (HUM); and Human Performance in Space (HPS). Also, there were interdisciplinary (INTER) lectures that covered a combination of those areas to emphasize the relationships between these disciplines in any space related activity. Each field of study presented a series of lectures designed primarily for non-experts. For example, medical specialists could understand the lectures on propulsion, while engineers and lawyers could understand the lectures on the effects of microgravity on the human body.

Dr. Niamh Shaw during core lecture series

Before the SSP, I have never studied about the space on academic level, however, in law school, I had the opportunity to familiarise with space law as a part of my international law studies. I have always had a great interest in space, and after reading many books and watching several films about this topic, I realised that I would like to engage myself in space studies more.

I have applied for the SSP in order to get to know a completely new world, of which I thought that it only existed in the science fiction movies. During my studies at the SSP, the interdisciplinary core lectures and workshops have provided me with the possibility to get acquainted with all the main aspects of the space industry, and I became extremely curious about this field.

Being a member of the Policy, Economic, and Law Department has allowed me to get a better knowledge of what space law is about. My aim is to work as a space lawyer in Hungary, and also to deal with issues related to space law at an international level.

Participating in the National Roadmap Team Project has enabled me to experience what it is like to work in a multicultural and international team. I am grateful that I had the opportunity to work on a project that might also be helpful for Hungary; and from now on, I can take an active part in developing the Hungarian space sector.

To sum up, the SSP has opened new doors for me, and gave me the chance to deepen my knowledge of the main space related topics. The SSP has also allowed me to get acquainted in a field with which I have never dealt before.

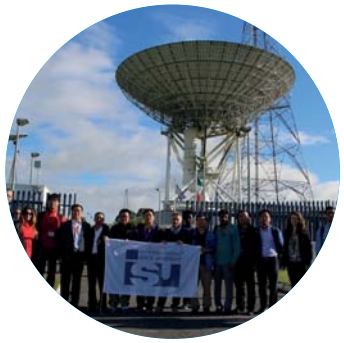
Istvan Sarhegyi
Hungary
SSP17 Participant

DEPARTMENTS

The Department Activity phase provides time for deeper examination of some of the topics covered in the Core Lectures. Groups are smaller, allowing for a greater exchange of knowledge and ideas as well as hands-on activities. Departmental weeks are an important opportunity for students to interact with faculty members, lecturers, and teaching associates and to build their professional networks.

Each department met for 14 separate activities, which included departmental discussions, simulations, hands-on workshops, field trips, professional visits, and participant presentations.

SPACE HUMANITIES
Chair: Ruth McAvinia
TA: Petter Evju Skanke



SPACE MANAGEMENT AND BUSINESS
Co-Chair: Remco Timmermans
Co-Chair: Daniel Rockberger
TA: Daniel Sackey

SPACE APPLICATIONS
Chair: Dr. Su-Yin Tan
TA: Funmilayo Erinfolami

SPACE SCIENCES
Chair: Eric Dahlstrom
TA: Marta Oliveria

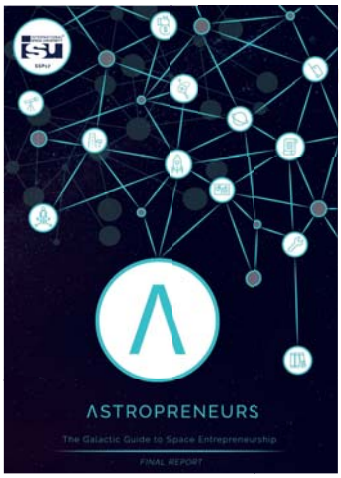
HUMAN PERFORMANCE IN SPACE
Chair: Dr. Ana Diaz Artiles
TA: Anderson Wilder

SPACE POLICY, ECONOMICS AND LAW
Chair: Dr. Ray Williamson
Associate Chair: Dr. Timiebi Aganaba
TA: Ana Cristina van Oijhuizen

SPACE ENGINEERING
Chair: Prof. Dennis Irwin
TA: Anderson Liew

TEAM PROJECTS

Astropreneurs



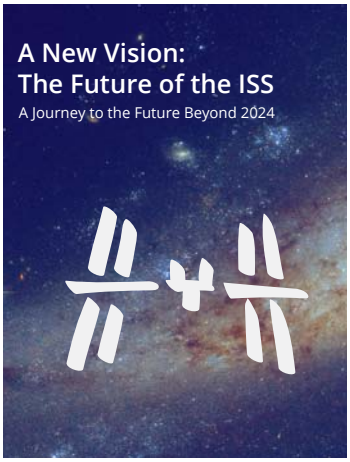
Co-Chair: Gary Martin
Co-Chair: Norah Patten
TA: Jacopo Panerati

Over the last decade, the commercial space industry has experienced rapid growth. Investments by venture capitalists and private investors now foster new space startups and companies. Planet Labs and Nanoracks are notable examples of small-scale startups successfully developing into growing space businesses. More and more often, these success stories inspire young entrepreneurs to start their own endeavors in the space industry.

Just as frequently, however, entrepreneurs encounter hurdles with regard to legal, financial, technical, or marketing matters that can ultimately prevent their efforts from being successful.

To mitigate this problem, the Astropreneurs project started with the review of a number of success and failure stories in the space startup world. The Astropreneurs team then used this knowledge to develop a web resource providing aspiring space entrepreneurs with comprehensive supporting tools, guidelines, and best practices that promote sustainable success and mitigate unnecessary risk, while creating a community-driven and enduring resource.

A New Vision: The Future of the ISS



Chair: Dr. Daniel Glover
Associate Chair: Dr. Jan Walter Schroeder
TA: Jonathan Faull

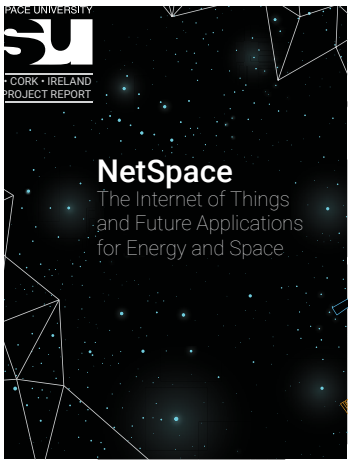
The International Space Station (ISS) is undoubtedly one of the world's greatest achievements and one of the most expensive endeavors in space. Orbiting 400 km above the Earth, this 450 metric ton structure has brought together scientists and engineers from all around the world for almost two decades. Discussions between its partner nations about the future have been ongoing and funding to keep it alive has been secured until 2024.

But what will come next? Could the ISS pursue its mission of space and science exploration for years to come, supported by its cooperating member states? Could it be dismantled, deorbited to Earth, or moved to a space graveyard orbit? Could it be partially or entirely sold to the private sector as a commercial or manufacturing facility? There are many possible future options available for further investigation.

The 2017 Team Project "A New Vision: the Future of the ISS" set its goal to determine and develop a technically, economically, and politically feasible scenario to repurpose the ISS past 2024.

The group of 28 engineers, scientists, policy makers, business experts, and designers took a leap forward to envision a bright future for the ISS. To this end, the group conducted an in-depth study consisting of paper analysis, brainstorming and evaluation of potential scenarios for the continued use of the ISS after 2024. The findings were developed in detail through a final report written by the skilled interdisciplinary team, aimed at existing and potential stakeholders, the space community and the general public. This was followed by a final group presentation within ISU SSP 2017 in Cork, Ireland.

TEAM PROJECTS



NetSpace

Chair: Joseph Pellegrino
TA: Robert Gevargiz

NetSpace was a Team Project of the ISU Space Studies Program 2017, working in the Internet of Things (IoT) sector. It investigated areas in the energy and space sectors in which the application of IoT technologies would lead to increased efficiency, reduced cost, and improved human safety. The emphasis was on the extraction, distribution, and transmission of energy.

NetSpace examined IoT-based solutions in four regimes: energy, Earth observation remote platforms, and future space endeavors. These were pre-defined as areas of high potential for the near-future application of IoT. The project explored common and interconnected aspects of seemingly disparate problems, identifying the means to leverage technology and expertise across the energy and space industries. Future cross-sector business opportunities were identified and proposed.

ARESS

Co-Chair: Dr. Ed Chester
Co-Chair: Robert Hill
Co-Chair: Dr. Niall Smith
TA: Andrew Butler

Never has there been more opportunity for new countries to benefit from the changing face of the space industry. Each emerging space state has strengths that it can harness to great advantage: the space industry requires companies of all sizes, across all disciplines, and the support of local and national governments. This yields a complex matrix of interactions that needs to be understood to realize the diverse and extensive commercial opportunities available.

The challenge set to the A Roadmap for Emerging Space States (ARESS) team was to analyze and understand how states such as Israel, India, and Luxembourg have developed space capabilities, and to apply the learning to emerging states, with a focus on Ireland, Hungary, Vietnam, Peru, Oman, and the Philippines. The ARESS team engaged with leading experts from space agencies including NASA and ESA, large aerospace companies like Airbus, smaller organizations like the Satellite Applications Catapult, and space related NGOs. Several visiting experts shared their latest ideas on how the global space industry is evolving and where new opportunities are arising. Such intensive expertise has rarely been applied to the topic of emerging space states.

The result of these efforts is a report that establishes an evidence-based framework for emerging states to use when formulating or expanding their national space strategies. This report forms a unique resource that will be relevant for years to come. It covers the major topics that a country needs to consider before expanding into new space opportunities.

This team project was developed by 28 participants from 15 countries, in close collaboration with several dozens of local and international specialists. The ARESS team commends the report to policy makers, industry, the public, and all those interested in capturing the economic and societal benefits of space.

WORKSHOPS

Fundamental and elective workshops are offered during the Core Lecture and Department Activity phases. The workshops cover all seven disciplinary departments and it provides participants with the opportunity to branch out or specialize further. This year, there were four mandatory fundamental workshops and thirty-four elective workshops.

The workshops included:

*Team Building with the Rube-Goldberg Machine
*Creative Thinking Design
*Robotics
*Living Disruption: Vision and Strategies
*Satellite Tool Kit
*Eggstronauts - Entry, Descent, and Landing Workshop
*Foresight and Innovation
*Space Debris
*Radar Image Processing
*Fly your Mission - Space Mission Operations
*Cosmic Threads
*After Federov: New Narratives for Space Exploration
*Space & the Arts: Take Your Creativity to New Heights!
*Space Problem Solving
*Commercial Space Accident Investigation 101
*The Politics of Space Mining – Futuristic Simulation Game
*Intelligent and Rapid Decision Making and Prototyping
*Experimental Microgravity Workshop
*Threats, Conflicts, and Military Space Applications
*Space Hero 101: Getting Along in Cramped Quarters, Under Stress, Far From Home
*Space Flight Systems Integration and Test
*Out of This World Communications
*Getting Around on a different World An Introduction to Rover Systems Design
*Lunar Experiences
*Crisis Communication and Media Training
*Space Resources Exploitation: Simulation of Discussion in an International Forum
*Boots on Mars: Earth Independent Human Exploration of Mars
*Understanding Alien Worlds
*Space, A New Frontier for Ethical Interrogation
*Planetary Science/Searching for Life on Mars
*Critical Review of the ISECG Global Exploration Roadmap
*High Impact Startups: 12 Critical Concepts for Triaging
*Startups and 10 Make or Break Techniques for Rapid De-Risking

PROFESSIONAL VISITS

The professional visits were developed by the SSP17 chairs. Participants engaged with a wide variety of local space-related companies and institutions throughout Ireland. They were able to visit the local facilities and interact with experts.

Remote Sensing at Kerry Dark Sky Reserve

The Space Applications department took part in the ground truthing exercise at Valentia Island. Located within Kerry County, participants traveled back through time learning the evolution of communication. From the use of fire to laying the first transatlantic cable, participants were able to discover the important significance of this island and how this historic evolution affected how we use modern day communication today.

Ground Control to SSP at Elfordstown Earth Station

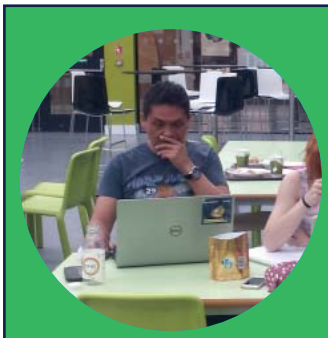
The Management and Business Department joined the Space Applications department for a professional visit to the National Space Center at Elfordstown Earth Station. The SSP participants took a site tour where they received technical and business presentations from the experts at National Space Center. After lunch, a small startup, SensL, gave a technical presentation on their products, including Silicon Photomultiplier Sensors.

Train like an Astronaut

The Human Performance in Space Department visited the National Maritime College of Ireland to participate in Water Survival Training as part of the "Train like an Astronaut" activity. Participants were put through a series of team, confidence, and stress inducing activities, which included a free fall exercise, damage repair, and sea survival situations.

Our Place in the Cosmos

Lough Gur is a historic region of Ireland that has been continuously inhabited for thousands of years. During the Space Humanities Department's visit, the local hosts explained how humans survived in this region over time, and the SSP participants learned how our ancient ancestors had a personal relationship to the night sky. With guidance from archaeoastronomer and archaeologist Dr. Frank Prendergast, the participants were given insight into how humans tried to understand our place the cosmos. Following presentations from the local guides, the ISU faculty led activities covering the orbital perspective and the closed loop systems needed for long space missions.



Before coming to ISU and after 16 years of experience, I used to think that I had international and interdisciplinary experience. The SSP17 experience proved me wrong. The variety of backgrounds was surprising: from singers to physicists, from undergraduate professionals to senior professionals, and from scientific researchers to former CEOs, I met colleagues from every corner of the world: Americas, China, India, Europe, Africa, and Middle East. Everyone of them reliable, committed and self driven individuals who make things happen. This was a life-changing experience from which I came up with a wider and wiser vision of our planet and universe. I gained a family with whom I expect to implement some relevant projects for the benefit of humankind.

Marco Valencia Arroyo
Peru
SSP17 Participant

Flying High in Dublin

Dublin Aerospace is involved with repairing and fixing auxiliary power units as well as looking after the maintenance and general overhaul of airplanes. The SSP participants had the opportunity to see inside an airplane stripped bare and undergoing a total overhaul. The visit to Namoo exposed the participants to the entire manufacturing process involved in making valves for rocket engines and satellites. While at Parameter Space, they were introduced to the research group designing and building Ireland's first satellite, Eirsat1, and their involvement with the Gaia mission of ESA.

Blackrock Castle

Blackrock Castle was the keystone venue for this year's SSP. Just minutes away from the CIT campus, Blackrock's outstanding interactive astronomy center and observatory was the leading host to multiple events such as lectures in searching for new planets around distant stars, geocaching (a high-tech treasure hunting game using GPS-enabled devices), and operating the Comet Chaser, a cinematic gaming experience to divert a comet on a crash course to collide with Earth. SSP participants also had the chance to enjoy a stargazing evening at the roof of observatory with the medieval backdrop of the castle and city of Cork.

UN Simulation for Space Policy, Economics, and Law

Participants visited the Cork County Council where they simulated the UN COPUOS sessions. Using real world scenarios, the participants learned valuable lessons as they debated for the improvement of the Outer Space Treaty and the draft of the new international treaty for Mars.

SSP17 Participants
at the Drombeg Stone Circle

Before arriving to ISU I had heard great things of the program from various friends who had undertaken it in previous years, but as much as they tried to convey how much of an unique experience it was, nothing can really transmit what it is like until you are here. Mix together a varied group of people with a passion for space but with different professional and academic backgrounds, levels of experience, nationalities and ways of life, put them under an extremely intense learning experience with fantastic activities and compelling lecturers, get them to interact sun-up to sun-down...and watch it unfold as personal connections, new ideas, and all manners of inspiration seep into your daily life throughout the program.

SSP is a break from reality: time goes by incredibly fast, but it feels as if you have been here forever and you have known the people around you for years; you are surrounded constantly by fascinating individuals, to the point that conversing with an astronaut or a world-class professional in their field becomes routine, almost mundane... although it never really is.

The ideas, concepts, and inspiration that are to be found in the SSP make it a remarkable experience on its own, but the human and professional connections to be made with the other participants, the staff, and the lecturers are what make it extraordinary. ISU has created in SSP a wonderful playground where to explore all facets of space, try your hand in new areas, and develop skills, all the while surrounded by outstanding playmates.

Antonio Martelo
Spain
SSP17 Participant

PUBLIC EVENTS & OUTREACH

This year's SSP featured a wide variety of evening events from distinguished space lecturers from around the world. Both at the CIT campus and in downtown Cork, this was a great way to enhance creativity and local participation. Innovative panel discussions were encouraged and ranged from the public's opinion on space exploration, disruptive and creative ideas to the current state of our space industry and the future of spaceflight.

Opening Ceremony

This year's SSP17 opening ceremony was a cause for a very big historic celebration as 2017 kicked off 30 years of the International Space University. The participants carried the flags of their countries for a big walk down the aisle of Cork's city hall highlighting what it means for ISU to be international, intercultural and interdisciplinary.

A number of distinguished speakers addressed the participants with the best advice they could give. Representatives in attendance were ISU President Walter Peeters, Chairman of the ISU Board of Trustees Christian Sallaberger, and SSP Director Dr. Omar Hatamleh. Also attending were Dr. Andy Aldrin and Cork's Lord Mayor Tony Fitzgerald.

These inspirational speakers combined with local Irish musician Jack Lukeman and the Irish dance troupe Prodijic blew the audience away with their talents.

The Hubble Space Telescope: A Quarter Century of Science

Surrounded by Illuminations of a full moon in CIT's Nexus Hall, NASA astronaut Jeff Hoffman presented his first-hand experiences regarding the initial technical problems the Hubble Telescope faced. Hoffman was on the first Hubble telescope repair mission and was in charge of repairing the Hubble by providing additional corrective mirrors for some of the onboard instruments. He also installed a new wide field and planetary camera. This mission was a full success and the crucial step to make the Hubble Space Telescope one of the most extraordinary and beloved space science missions in the world. Hoffman now serves as professor of aeronautics and astronautics at MIT.

John Kennedy, Richard Nixon, and the American Space Program

John Logsdon, author of *John F. Kennedy and the Race to the Moon* and *After Apollo?: Richard Nixon and the American Space Program* revealed the main reasons for Kennedy's decision to design a successful Apollo program, and the deliberations by Nixon to end the Apollo program which ultimately put the US space program on a different course.

International Astronaut Panel

Four astronauts took to the stage in this year's 30th ISU SSP Astronaut panel discussion in Cork, Ireland. Bob Thirsk, Nicole Stott, Dan Tani, and ISU alumni Soyeon Yi recalled their personal spaceflight experiences. Also, Paolo Nespoli shared an inspirational video message all the way from Star City, where Nespoli was counting down for his launch to the International Space Station. As one of the most popular events at this year's SSP, more than 500 guests from all over Ireland were in attendance.

SpaceUp Ireland

The Irish public and SSP participants were excited to attend Ireland's second SpaceUp Unconference during this year's Space Studies Program. A vast mix of dynamic and inspirational topics were shared. Talks ranged from Latin America's very first mission to the Mars Desert Research Station in Utah and how SSP's very own participant, Beth Healy, survived 14 months on ESA's Concordia Station located on the Antarctic Plateau.

Gerald A. Soffen Memorial Lecture - Dan Tani

It was a full moon in CIT's Nexus Hall as NASA Astronaut Dan Tani took to the floor for the first public talk in the public lecture series. Tani spoke about his life as an astronaut within NASA's human spaceflight program and his personal experiences in space. With more than 16 years of experience at NASA, Tani shared his stories about flying on two space missions with 132 days in space and six space walks under his belt.

Tani is considered one of the coolest teachers in the world because he now teaches science, engineering, and design at a high school in Japan.

Each year, ISU honours the memory of one of its greatest supporters, Dr. Gerald Soffen, with a lecture featuring a prominent visionary in the space sector and we are delighted that Tani was a part of it.

I am one of those people saying that ISU has completely changed my life. Not only do I now proudly work in the space industry, I have also been involved in every SSP since my own in 2013. I was a TP TA for SSP15, then a TP Chair for SSP16 and now a Department Chair for SSP17. I have also been involved in ISU External Relations for the last three years. Being a chair really brings you in the heart of the program, responsible for an important part of the participant experience. This is also a position in which the value of the strong ISU network in the space industry becomes fully visible. As a chair you have a tremendous pool of the best space experts in the world to build a program with, most of whom are just a phone call or email away. Being a TA or Chair is as intense, but definitely as rewarding as being an SSP participant. See you again next year!

Remco Timmermans
Netherlands
SSP17 Co-Chair
Department of Space Management and Business Department

LEGO® SERIOUS PLAY®
Robotics Competition

Six SSP17 teams designed, engineered and built autonomous LEGO® robots simulating remote planetary exploration. Lead by Professor Kazuya Yoshida from Tohoku University in Japan, the participants competed in the robotics obstacle yard collecting stones that represented interesting geological formations and carrying them back to the basecamp. This represented a "sample return mission" and provided the participants with extra points.

As one of the many sold out SSP events, this was a fun and much loved experience for the Irish public of all ages!

The Moonshot - Venture Challenge

Four teams from ISU's SSP stormed Dublin's digital hub for a day of cutting –edge idea generation. Ireland's top entrepreneur experts presented a panoptic of concepts while participants shared their fresh startup ideas.

The winning team presented its unique concept of a cellular phone signal boost balloon to be used at concerts and big events. The team memebers were presented with €10,000 of mentoring opportunity from Ireland's Bailylabs.

Reaching the Edge of Space

SSP participants successfully launched a balloon from Ireland's Met Eireann Observatory in Cahersiveen to the stratosphere and returned it safely back to Earth. The balloon was armed with a package of various electronics such as cameras, a GPS tracker, and other data recording devices. It reached an altitude of 27km just before it popped. The balloon's electronics safely parachuted back to earth and landed in a field of cows just over 141km from the launch site. Overall, the mission was a complete success, returning beautiful images of the Earth curvature taken from the edge of space.

A Nightwatchman's Journey

One of the most beloved lectures given at SSP was by internationally renowned Canadian astronomer, Dr. David Levy. Dr. Levy shared his personal stories about how he discovered 21 comets—eight of them by only using his backyard telescope. While sharing his hand-written notes, Dr. Levy used a mix of multimedia to share his incredible personal life-story. David received a standing ovation from this year's SSP17 lecture series attendees.

Rocket Launch - Irish Space Coast

Cork, Ireland became the Irish Space Coast for one day while five teams from the SSP Space Engineering Department launched their rockets into the sky. After spending a week engineering and crafting the perfect rocket, the participants attempted to launch from the rocket platform. The CIT stadium was packed to the brim for this sold out event as rockets launched up to 300 meters with fragile payloads. Thanks to clever engineering, most of the payloads returned safely back to earth.

Closing Ceremony

The SSP17 closing ceremony took place on the very last day of the program at Cork County Hall As the participants' names were called, they each walked on stage to receive their graduation certificates from SSP Director Omar Hatamleh and ISU President Walter Peeters. Each certificate was signed by the ISU Chancellor, Buzz Aldrin. The class speaker, Miles Bengtson, gave the final reflection on behalf of the SSP17 participants.

SSP18's host country—the Netherlands—was introduced by local host representative, Wendy Mensink. She invited the SSP17 delegation to be involved with next year's program.

Both Victoria Schebek and Audrey Berquard were the chosen representatives for the class of SSP17. They will now lead the effort to help keep the participants closely connected into their future endavours.

When I found ISU it was like a dream come true, finally a space focused program that actually wants people from all backgrounds, not just engineers and scientists. It almost seemed to good to be true, in fact. But, I had a gut feeling that this is a special place, even before talking with anyone about it.

Based on everything I could learn before coming to SSP17, I expected it to be intense, to be sleep deprived, to be surrounded by smart space nerds, to be fun, and to connect to an excellent network in space. Since I have arrived here, my already high expectations have been repeatedly exceeded on all fronts. It is an experience that is hard to truly appreciate without going through it. SSP is one of those unique environments that almost immediately breaks down barriers between total strangers across age, language, and culture and allows deep connections to form in a matter of days or weeks that would normally take months or years.

If this idea unfolds the way I think it can then SSP will be a key factor enabling me to turn my dream into reality and will represent a true turning point in my life.

Garry Calnan
USA
SSP17 Participant

SOCIAL ACTIVITIES

CULTURE NIGHT

It was the "not to be missed" event of SSP! Every Friday night, participants from the 26 represented countries shared their culture in a very entertaining and sometimes eccentric way! Interactive highlights included Japanese origami and the traditional SSP presentation of Canada's canoe. But, ultimately, participants and their tastebuds were won over by the best smorgasbord of sweet and savory delights found on earth.

The evening continued on with our very own SSP17 live bands and dancing late into the night!

GALA DINNER & SPACE MASQUERADE

It was considered the ISU dinner of the decade. Thanks to the generous sponsors, Aerospace and Lockheed Martin, the extended ISU community enjoyed an energenetic evening of celebration.

This year's SSP Space Masquerade was masked in mystery as the participants donned their most creative space costumes! Held in conjunction with the ISU alumni conference, participants had a bit of healthy competition from the seasoned SSP alumni who were dressed to impress.

SPORTING ACTIVITIES

Things really heated up on the green as participants left the lecture halls to blow off steam. They played popular sports like soccer on the green fields of CIT's top-notch sporting facilities. Ping-pong was also a prominent hit, but it was Ultimate Frisbee that won the hearts of the SSP participants.

THE OFFICIAL IRELAND TOUR

The SSP participants embarked on a stunning journey of a lifetime, ticking off the ultimate wild and wonderful Irish bucket list! This remarkable two-day journey included discovering some of best "must see" destinations including the Bunratty and Rock of Cashel. Participants also posed for unforgettable selfies at the always stunning Cliffs of Moher.

SOCIAL MEDIA

Similar to previous SSP editions, ISU ran a large-scale social media campaign, in association with our hosts at CIT. This year the campaign utilized Facebook, LinkedIn, Instagram, and the SSP17 blog, and with a slightly larger emphasis on Twitter and YouTube. We also started experimenting with Periscope. The social media campaign had several objectives, including alerting the online audiences of upcoming live and streamed events, telling the story of the ongoing program, recognizing the program sponsors, and highlighting Ireland as our host country. In addition to social media, we were also featured extensively in local press, largely thanks to our media partners ETC and the Irish Examiner.

We measured the results of our campaign on Twitter, using the Tweetbinder tool, tracking the three official campaign hashtags #SSP17, #OurSpaceOurTime, and #SummerOfSpace, plus mentions of the @ISU_SSP account.

This provides the following results:

@ISU_SSP
#SSP17

17,261
Number of tweets using #SSP17

3,259
Contributors

94,500,000
Potential impacts*

17,500,000
Potential reach*

*Potential impacts—The potential number of times someone could have seen the hashtag

*Potential reach—Number of unique users that could have seen the hashtag

CONNECT WITH SSP17

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@ISU_SSP
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Spaceuniversity

FACEBOOK
ISU Space Studies Program

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International Space University

SSP17 WEBSITE
ssp17.isunet.edu

SSP17 BLOG POSTS
ssp17.isunet.edu/blog

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The Aerospace Corporation

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National Aeronautics and Space Administration (NASA)
UK Space Agency (UKSA)
Host Institute
Cork Institute of Technology (CIT)

Sponsors
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Individual Sponsors
Jim (and Lin) Burke
Carol Carnett
Juan de Dalmau
Michael Potter
Roger Pierce

DIRECTOR'S RETROSPECTIVE

This year's Space Studies Program (SSP) in Cork, Ireland marked the 30th anniversary of the program. Over the past nine weeks, the program hosted 112 participants from 26 different countries. During that time, participants heard 63 Core Lectures from world leading experts, including astronauts and top level executives from different space agencies. For the first time during an SSP we added six lectures to cover several hot topics in technology and innovation. The evening events included distinguished lectures and panels covering various disciplines and areas of the space sector. The SSP also provided participants with an increased selection of workshops in different disciplines compared to previous years. Academic activities were carefully selected to bring high value to the participants. And of course, the four Team Projects were: A Roadmap for Emerging States in Space (ARESS), Astropreneurs, A New Vision: The Future of the ISS, and NetSpace. Each of these Team Projects represented a different challenge and taught the participants how to work together in a complex, international, intercultural, and interdisciplinary environment.

Since 1988, ISU SSP has demonstrated the capability to have a positive impact on so many different levels. Past, current, and future SSP participants will have important roles and will be a catalyst to make future complex international strategic alliances possible.

The involvement of participants in an international environment, enriched by multiple cultural perspectives, enabled by the ability to capitalize on multiple intellectual disciplines, has been one of the core philosophies of the SSP. The learning experience during the SSP will provide participants with the tools, the capacity, and the will to confront and to conquer the daunting encounters the future will present.

Over the past few weeks, I have watched the transformation of eager participants into becoming the future world leaders in the space sector. It will be very exciting to see how they will use their knowledge and experience gained here at SSP and apply it to the real world.

I wish all the participants the very best in their future endeavours.

Omar Hatamleh, SSP17 Director

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More information about SSP can be found under www.isunet.edu

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