Space Studies Program 2016 Haifa, Israel

#DREAMITLAUNCHIT

RETROSPECTIVE

INTERNATIONAL SPACE UNIVERSITY

SSP16 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, 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, private sector, and research institutions worldwide. True to its founding principles, the education at ISU revolves around the 3Is – International, Interdisciplinary and Intercultural. Over the past 29 years, more than 4200 students from over 100 countries have graduated from ISU.

SPACE STUDIES PROGRAM (SSP)

ISU offers several different programs targeted at different demographics, from short term executive programs to a one- or two-year master's 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 the principal space related fields, both non-technical and technical and ranges from policy and law, business and management and humanities to life sciences, engineering, physical sciences and space applications. The shared experience of an international, intensive, interactive working environment is an ideal networking forum leading to the creation of an extensive, international, multidisciplinary professional network.

The SSP is unique in that it takes place in a new location every year. This keeps the program truly international and adds an exciting dynamic as well as new resources and expertise. Anyone with a passion and a demonstrated interest for all-things space, intent on joining the workforce in the space sector, and keen on meeting like-minded people is a good fit for SSP.

International Space University was pleased to bring its Space Studies program for the first time to the Middle East - Technion, the Israel Institute of Technology, was chosen to host SSP16 based upon its excellent academic credentials, proximity to the Israeli space industry, access to a large number of eager ISU alumni, and an excellent local organizing team that looked after every logistical detail.

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 of Science in Space Studies (MSS)
2011: First Southern Hemisphere Summer Space Program in Australia
2016: SSP16 held in Haifa, Israel — The first SSP in the Middle East

ISU CENTRAL CAMPUS
STRASBOURG, FRANCE

SSP16 HOST INSTITUTION

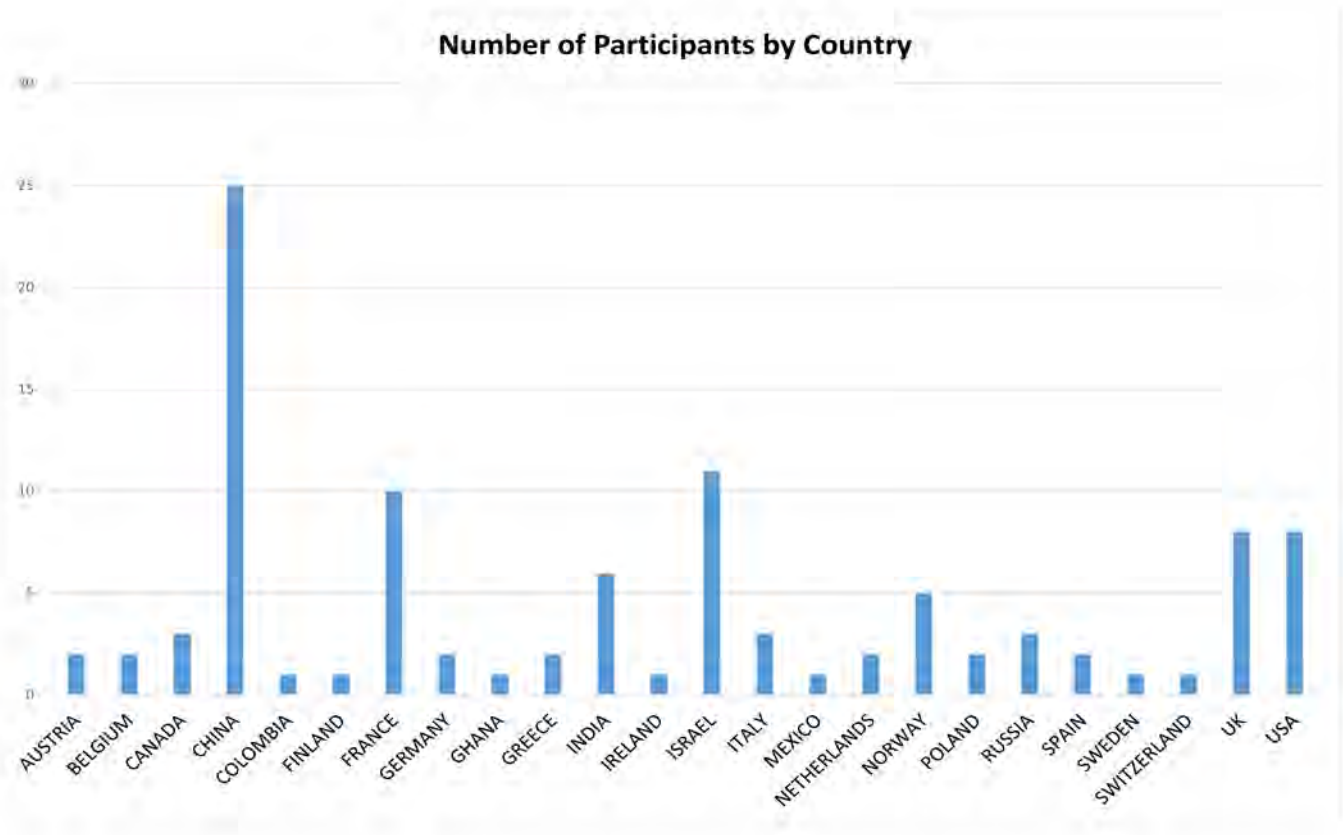
TECHNION
ISRAEL INSTUTE OF TECHNOLOGY
HAIFA, ISRAEL

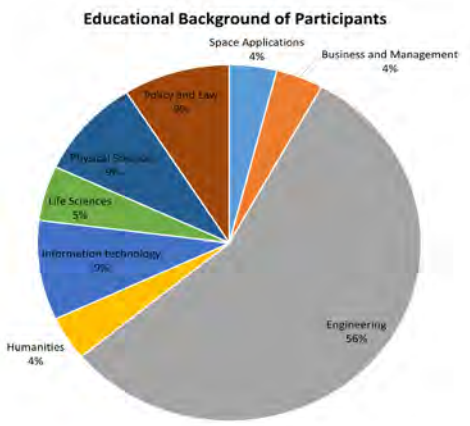
FACULTY AND STAFF

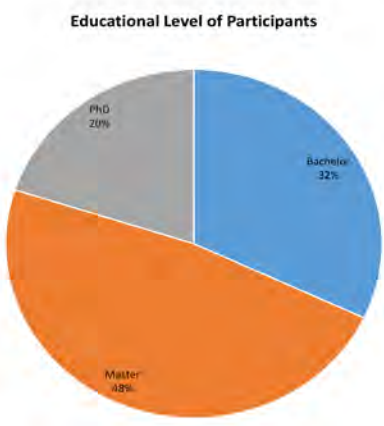
The SSP invites approximately one hundred and fifty lecturers and experts from around the world, which include top scientists, engineers, astronauts, space agency heads, artists, entrepreneurs, and managers from private industry, space agencies, non-profits, universities and research institutions. SSP faculty and distinguished lecturers included current Israel Space Agency Director General Avraham Blasberger, NASA Associate Administrator for Education Donald James, Apollo 11 astronaut and ISU chancellor Buzz Aldrin, Mikhail Marov from the Russian Academy of Sciences, head of the Ramon Foundation Rona Ramon, and many more from all over the world.

PARTICIPANTS

This year, one hundred and three participants attended the program, representing twenty-three countries — with Ghana represented for the very first time in ISU's history. Most had an educational background in engineering, with the rest having degrees in a variety of business, science and social science disciplines.







WHAT DO PARTICIPANTS GAIN FROM SSP?

- **Knowledge of all fields in the space sector:** For eight weeks, participants are exposed to all major fields in the space sector including engineering, science, applications, policy, economics, law, management, business, arts, an health.

- **International exposure:** SSP offers participants the opportunity to meet with top experts, scientists and administrators from space agencies, private companies, and research institutions from around the world. It gives them the chance to have a personal connection with industry leaders.

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

THE FIRST ISU SPACE SELFIE

- **Working in 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.

SSP CLASS OF 2016 WITH ISU CHANCELLOR DR. BUZZ ALDRIN

Although I work at NASA, there is a lot I do not know about space. The SSP core lectures really helped me become well-rounded in technical areas outside my specialty. Also, my eyes were opened for the first time to understand the importance of space policy and law, and I let the hardcore geek in me unwind and enjoy space humanities. My view on the future of space exploration is refreshed and optimistic and I have high hopes for what can be accomplished with funding from commercial partners and international cooperation. Thanks to SSP, I have a new appreciation and vision for the space industry and my role in it!

Marit Meyer, USA

CURRICULUM

The interdisciplinary SSP curriculum emphasizes international cooperation and provides participants with varied perspectives on the world's space activities; perspectives which 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, and each year it evolves to better meet the needs of its students and their employers.

Throughout the course, students 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. There are three phases to SSP: Core Lectures, Department Activities, and Team Project.

CORE LECTURES

During the Core Lecture weeks, fifty-nine 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). Many were interdisciplinary (INTER) lectures which covered a combination of those areas in order 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. Medical specialists could understand lectures on propulsion, while engineers and lawyers could understand the lectures on the effects of weightlessness on the human body.

SSP has influenced my life positively in so many ways beyond my expectation. The kind of multicultural, multidisciplinary environment that ISU creates by bringing people from different backgrounds and disciplines exposes participants to a great wealth of knowledge. I learned a lot from all the persons I came across. I learnt a great deal about the culture, and from the academic expertise of lecturers and colleagues. I was amazed to sit in class with participants from engineering, medicine, law and business background and with quite a number of them already holding PhD; and coming from a science background. I am so curious and I asked a lot of questions on the individual level. In a crowd environment I don't like to speak, but on an individual level I managed to have some personal contacts with people. I get to know what they do and how I can benefit from it. This was a kind of networking in disguise. ISU is more than a goldmine to me. I also benefited so much from the core lectures. In fact ISU, as an international university attract the best talent from all over the world to impart participants with up-to-date knowledge in space studies. The excellent blend of course modules epitomizes true professional training. It is one unique thing which you can not get anywhere in the world. This is a particular characteristic of ISU. When you come to ISU you start to gain a lot from a broad spectrum of knowledge pertaining space and the value of it to humanity. You tap so much from the fountain of high quality and practical knowledge of astronauts, Space scientists and business giants from commercial entities and strategic institutions. But not just from their knowledge, also from their rich experiences through personal interactions with them, a golden opportunity which is so rare to come by. The experts are drawn from industry, from academia, from NASA, ESA and other space agencies, from big institutions and top universities in the world. You get quality knowledge, so I learnt a lot. Besides, there are certain things which are taught but there are other things which are caught. And I caught a lot of things from the learning atmosphere created by SSP that were not taught in any classroom. Due to the multidimensional nature of ISU education, I learnt a lot of things through professional visits which consolidated the knowledge I had from the core lectures. From my interactions and work with staff and participants, I learnt amazing ways of doing things and how to achieve excellent results within a limited time frame.

Francis Kudjoe, Ghana

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 network.

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

SPACE APPLICATIONS

Chair: Dr. Su-Yin Tan

TA: Petter Evju Skanke

SPACE ENGINEERING

Chair: Joseph Pellegrino

Associate Chair: Maya Glickman-Pariente

TA: Cory Newman

HUMAN PERFORMANCE IN SPACE

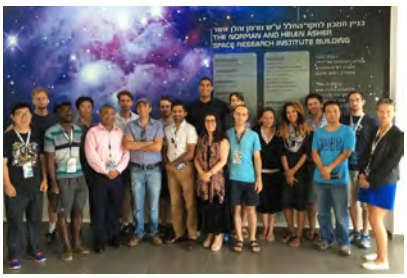
Chair: Dr. Kris Lehnhart

TA: Irina Thaler

SPACE HUMANITIES

Chairs: Dr. Norah Patten & Dr. Geoff Steeves

TA: Yevgeny Tsodikovich



SPACE MANAGEMENT AND BUSINESS

Chair: Adil Jafry

TAs: Allyson Reneau & Maria Lucas Rhimbassen

SPACE POLICY, ECONOMICS AND LAW

Chair: Christopher Johnson

TA: Andrea Harrington

SPACE SCIENCES

Chair: Dr. Rene Laufer

TA: Dan Cohen

TEAM PROJECTS

Artificial Gravity

Co-Chair: Remco Timmermans
Co-Chair: François Spiero
TA: Jarosław Jaworski

The aim of this project was to conduct a conceptual design study for a commercial space station on behalf of Axiom Space. This station contains a section with artificial gravity and another with a microgravity environment, both of which shall be fully operational by 2040. The station will allow people to live in an Earth-like environment, while enabling in-orbit manufacturing, scientific research and space tourism.
Areas of analysis focused primarily on the engineering challenges, legal implications, business models, societal aspects, and prospective policy. A conceptual design was then drafted and complemented by a 3D printed version presented during the Final Presentation.

Implications of New Discoveries in the Martian Environment

Chair: Jacob Cohen
TA: Josh Richards

The mission of the aMARTE Team was to review the most recent discoveries on the Martian environment, evaluate the different implications for human Mars exploration, and produce a comprehensive set of scientific and technological recommendations for future development. With the generous support of the NASA Mars Exploration Program, the aMARTE Team specifically investigated the findings on Mars related to flowing water, perchlorates, nitrates, methane and radiation; produced a significant number of recommendations for future human exploration of Mars; and produced scientific and technological research roadmaps that will bridge the strategic knowledge gaps to reduce the risks in human Mars missions.

Space Big Data

Chair: Barak Fishbain
Associate Chair: Daniel Brack
TA: Sanja Šćepanović

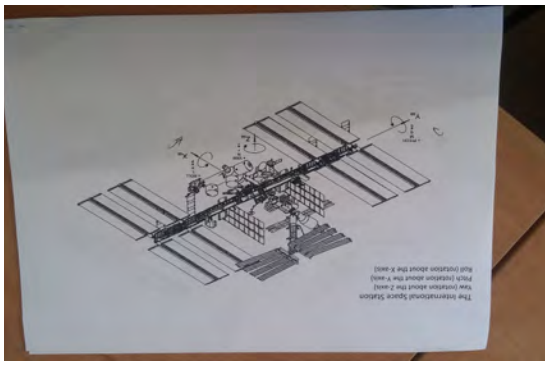
Images of the Earth and stars, worldwide communication, weather prediction and route planning at the palm of your hand are just some of the examples of space big data (SBD) and its applications.
The team's mission was to define SBD, map the activities of stakeholders, identify challenges they face, suggest potential solutions, and outline recommendations to promote growth of the SBD sector. After a study of activities and challenges of the stakeholders involved in SBD, core challenges that require coordination across the whole sector are identified: state of the SBD market, engineering, interoperability and openness versus privacy. Finally, potential solutions and recommendations are provided to serve as a starting point for building a roadmap to success for the SBD sector.

WORKSHOPS

Fundamental and elective workshops are offered during the Core Lecture and Department Activity phases. The workshops cover all seven disciplinary areas which the departments represent, providing participants with the opportunity to branch out and/or specialize further in a variety of topics of their choosing. This year there were three mandatory fundamental workshops and nineteen elective workshops.

The workshops included:

- Team Project Management and Foundation Skills
- Report Writing and Presentation
- Team Building
- Media Training and Crisis Communication
- ISU LEGO Robotics Competition
- Space Mining - Future Prospects and the Geopolitical Challenge
- Rosetta, Mission: Possible
- Ramon Space Lab - Bringing Space into the Classroom
- Strategic Planning in Satellite Telecommunication Industry
- Space Operations Workshop
- Space Debris Workshop
- Space Operations Analogs
- Space Outreach - Practice
- Space, a New Frontier for Ethical Interrogation
- Business Models for New Space - How to Design Your New Space Company
- Extending the Reach of Outreach
- STK Workshop
- Radar Image Processing Workshop



I think SSP has influenced me a lot, because here I met a lot of people I have never met before. I learnt a lot from their experience, their knowledge and the lecturer have given wonderful lessons, I learned a lot. Especially I learned a lot from the team project. It showed me how to improve, how to do research, how to make a wonderful presentation, like an academic opera,these is the best experience from SSP.
The time here is not wasted time, it is very useful.

Bing Zhang, China

PROFESSIONAL VISITS

SSP16 participants had the opportunity to go on professional visits to various space-related institutes and companies. They were able to directly observe the facilities and interact with experts.

Israel Aerospace Industries MBT Space Division

APP and MGB departments visited Israel Aerospace Industries, the prime contractor for all Israeli space programs and the largest satellite manufacturer in Israel. The guided tour took the participants to the show room, integration facility and AMOS communication satellite control center.

Moona - Young Entrepreneurs Mentoring Clinic

The participants of MGB visited the space incubator called Moona and interacted with local kids to inspire and coach them. Through sharing their knowledge with the next generation, the participants learned about management, start-ups and presenting ideas. Hands-on activities for the kids included making and presenting their own elevator pitches, and it was clear that this highly intergenerational department activity left its inspirational mark.

Wise Observatory

APP, ENG, HUM and SCI departments visited the Wise Observatory located near the Ramon Crater in the Negev Desert. The astronomical observatory is owned and operated by Tel-Aviv University, and is the only professional astronomical observatory in Israel. Participants learned about the interdisciplinary fields of astronomy, astrophysics, space applications and remote sensing.

Scientific Center for Technological Education

In the middle of the Israeli Negev desert, the participants of HUM met with high school children currently building a satellite. The participants were astonished that satellites can be built in such remote locations as the peripheral city of Yeruham and inspired by the way a satellite building project can uplift children and build their self-esteem to excel in their STEM studies.

Ben-Gurion University of the Negev

The APP department visited the Earth and Planetary Image Facility of the Ben-Gurion University in Beersheba. Participants investigated how remote sensing techniques can be connected with ground truth findings. The professional visit included a ground penetrating radar demonstration and a field trip to Makhtesh Gadol where satellite images were studied and surface samples were analyzed through spectrography.

And many more professional visits including:

- Israel Oceanographic and Limnologic Research Institute
- Gilat Satellite Networks Ltd.
- Elbit Systems
- Asher Space Research Institute
- ORBIT Communication Systems Ltd.
- Israel Meteorological Institute
- Rambam Hospital

SSP changed my perspective and introduced me to fields and disciplines I never knew before.
It allowed me to find new directions for the future and introduced me to many amazing and interesting people. I was also part of a group project I did not know I could be a part of, which taught me many new things.

Maya Bartov, Israel

PUBLIC EVENTS & OUTREACH

A variety of evening events and talks were given by space experts and distinguished guests during SSP that provided insights from their personal experiences. They helped educate participants and the public on the current state of the space industry, future of spaceflight, and the history of space exploration. Some events were conducted as panel discussions that allowed enhanced interaction between panelists and participants.

Opening Ceremony

The most formal SSP event kicked off the program in an international, intercultural and interdisciplinary way. In ISU tradition, the participants entered the ceremony behind their respective flags, and a number of distinguished speakers addressed the participants, such as ISU President Walter Peeters, Rona Ramon, and Mayor of Haifa Yona Yahav. The visionary speakers in combination with talented student musicians from Technion presenting local culture, made the evening an unforgettable beginning to an unforgettable summer.

The Hubble Space Telescope: A Quarter Century of Science

The first public event at the Technion gathered both participants, staff, and the local community in a full auditorium. During this Lecture, Jeff Hoffman, currently professor of aeronautics and astronautics at MIT, told about the initial technical problems the Hubble Space Telescope faced. Jeff Hoffman himself, as NASA astronaut and astronomer, was part of the space shuttle STS-61 crew. This mission was the first Hubble telescope service mission, in charge of repairing the telescope by putting additional corrective mirrors for some of the onboard instruments and install a new wide field and planetary camera. The 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.

John Kennedy, Richard Nixon, and the American Space Program

ISU faculty member John Logsdon, author of the 2010 book “John F. Kennedy and the Race to the Moon” and the 2015 book “After Apollo?: Richard Nixon and the American Space Program” discussed the reasons for Kennedy’s decision to design a successful Apollo program, and the deliberations by Nixon to end the Apollo program and put the US space program on a different course.

International Astronaut Panel

The SSP16 astronaut panel spanned several generations of the human space exploration era, with astronauts who have flown on the Space Shuttle, the International Space Station and potentially beyond.

The three astronauts on the panel were NASA Astronaut Jeff Hoffman, NASA Astronaut and ISU alumna Jessica Meir, and Italian ESA Astronaut Paolo Nespoli (through a very successful webcast). The astronauts talked about their personal flight experiences, the commercial era and the future of human spaceflight. Popular among the public, the event was attended by more than five hundred people in person, with many more tuning in to the webcast.

SpaceUp Haifa

The first SpaceUp Unconference held in the Middle East! SpaceUp Haifa has been hosted by the Technion Israel Institute of Technology and the International Space University, during the ISU Space Studies Program 2016. On Friday 22 July 2016 the Technion Faculty of Aerospace Engineering opened its doors to anyone willing to share his or her vision about space. SpaceUp Haifa aimed at being a new open discussion and idea generation platform for the region's space community.

Israel in Space Panel

The SSP16 Israel in space panel was a very interesting discussion session with the top representatives of Israel's different space sectors, including panelist from the government, academia, industry and startups.

They were discussing the current status of Israel's position in space as well as future goals, niches and leadership opportunities. Amon the panlists were Avigdor Blasberger (Israel Space Agency Director General), Amnon Harari (Director of Space Program Office, Defense R&D, Israel Ministry of Defense), Opher Doron (Director General, MBT-Space, Israel Aerospace Industries), Pini Gurfil (Director of Asher Space Research Institute, Technion), and Ofer Lapid (Space Entrepreneur, SpaceNest, and ISU Board of Trustees member).

Gerald A. Soffen Memorial Lecture

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. Few are more visionary than ISU's Chancellor and Apollo 11 moonwalker, Dr. Buzz Aldrin. Now, 47 years later, Aldrin is sharing his vision for establishing a permanent human presence on Mars. And summarized as follows - "Get your a** to Mars!", dr. Aldrin declared to the starstruck crowd as he kicked an imaginary posterior into gear. "These five words I've been telling everyone on planet Earth," dr. Aldrin passionately announced in a slightly gravelly voice. "Let's go for it!"

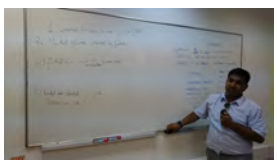
Lego Robotics Competition

A traditional ISU fixture, the robotics competition saw participants, assisted by robotics experts, design and build autonomous robots to simulate planetary exploration. Watched by staff, participants and the public of all ages, six teams competed in the robotics obstacle yard to collect 'stones' that simulated interesting geological formations.









Space Startup Competition

ISU conducted its first ever Space Startup Competition during SSP16. Over the course of four weeks, several activities were held for aspiring entrepreneurs including an idea match-making event, a startup weekend with workshops provided by volunteer mentors, and a final pitch competition. The winning SSP 16 participant team of Kartik Kumar and Mitchell Scher received a cash prize of $5,000 given by the Heinline Prize Trust for excellence in Space Commerce.

The Human Side of the Columbia Mission

In a moving presentation, individuals who were personally close to the Space Shuttle Columbia accident shared their experiences. Rona Ramon and Jonathan Clark both lost their spouses in the accident, and Doug Hamilton and John Connolly shared their experiences as NASA employees who served on the 2003 Space Shuttle Columbia accident response team. Together, the four panelists emphasized the "human side" of the disaster and how while human spaceflight presents risks, it also brings us together. It was a special experience for participants to hear of the SSP Director's direct involvement in the emotional aftermath of one of the most tragic events in spaceflight history.

Ballon Launch - Ashkalon takes off into space

The city of Ashkalon welcomed ISU SSP16 ENG and SCI joint activity on July 10, 2016. Scientific experiments were on board of a drone, which was sent to the stratosphere by the SSP16 Engineering department. We used the balloon as a tribute to Victor Francis Hess, Nobel laureate for the discovery of cosmic radiation using a balloon! To get the data the science department took charge of the ground station, from where we followed the drone in the sky, using amateur radio. The balloon flew according to the simulation and it got to the incredible altitude of 27 km. Unfortunately it landed in the Mediterranean Sea, at about 14 km from the shore. Both the Navy, the Coast Guard and our boat searched for it but it was only recorved 7 days later by two kayaks riders, allowing collected data and pictures to be exploited by the participants for the individual assignments.

A Nightwatchman's Journey

The last evening lecture was by David Levy, an internationally renowned Canadian astronomer who is celebrating 50 years of searching the sky for comets and asteroids. Dr. Levy has discovered 21 comets, eight of them using his own backyard telescopes. His discovery of Shoemaker at the Palomar Observatory in California, produces the most spectacular explosions ever witnessed in the solar system.

Rocket Launch

No space program can exist without rockets. For weeks, five participant teams and one staff team labored to design and build the best model rocket that could fly to three hundred meters with a fragile payload and bring it back safely. Model Rockets were launched from the Kibbutz Galed who welcomed the general public to watch some spectacular successes.

Closing Ceremony

The SSP16 closing ceremony at Madatech Haifa Museum took place in an amphitheatre under the evening skies of the host city, at the site of the very first Technion building. During the closing reception, the museum was open exclusively for ISU, and participants were guided through science and space exhibits. With tears, smiles, the speech from the class speaker, Nahum Zahora, the certificate ceremony, memorable entertainment and visionary speakers, the program ended with a hyperspectral range of feelings.

Other evening talks and discussions included:

- Film Night with Michael Potter and Chris Stott, Orphans of Apollo
- Space Entrepreneur Panel moderated by Chris Stott
- Space Education Panel moderated by Donald James
- Arthur C. Clarke Panel: Where Space Meet Popular Culture moderated by Chris Welch
- Breakthough Initiative with Dr. Simon "Pete" Worden

SOCIAL EVENTS

CULTURE NIGHT

Wednesday nights at SSP16 were dedicated to participants, allowing each country to share insights about their nation and culture. Highly relevant in today's globalized world, these nights are a way of understanding each other and forming friendships across borders.

SPACE MASQUERADE

Space masquerade is an annual SSP gathering where the participants can let out their inner space geeks. It was held in conjunction with the ISU alumni conference, and participants could network with alumni from various backgrounds and locations.

SPORTS ACTIVITIES

Although space is the magnet that brings everyone together, it is not the only uniting factor at the SSP. International teams of participants and staff bonded over basketball, ping pong, dancing, Krav Maga, Matkot and alumni football/soccer tournaments. The city of Haifa and the region around afforded plenty of opportunities for group hiking, rafting, swimming and skydiving.

ISRAEL NATURE AND HERITAGE TOUR

The local organizing team put together an optional two-day tour around Israel which gave the participants the opportunity to experience the best of the best of Israel's rich culture, history and nature. The highly successful tour became a welcome break in an intense program, and gave the participants a taste of Jerusalem, Masada, the Dead Sea and the Bedouin culture. The tour coincided with the Perseid meteor shower, which looked extra spectacular from the Judean desert and connected the participants with cosmos in a unique way.

SOCIAL MEDIA

This year, the SSP ran a very effective social media campaign in association with our hosts at Technion, Israel Institute of Technology. Utilizing a number of platforms such as Twitter, Facebook, Instagram, SSP blog and Youtube, information on the SSP and its activities were brought to people on an international scale. Special hashtags were used to measure the social media impact of the SSP activities and to publicize the collaborations. News articles and television interviews were carried out both a domestic and international scale that highlighted the international interest in the space sector.

@ISU_SSP

#SSP16

8,973
Number of tweets using #SSP16

1,795
Contributors

39,700,000
Potential impacts*

7,900,000
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

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SSP16 WEBSITE
ssp16.isunet.edu

SSP16 BLOG POSTS
ssp16.isunet.edu/blog

Life at SSP is something you can not describe with words, you have to live it to experience the great adrenaline rush of being part of ISU family, the Space Mafia. This is a great experience that has marked my life, and doing a retrospective view I can say that now I define myself as before and after ISU. During the past 8 weeks I have learned so many cool new things during the core lectures, department and TP! I had the opportunity of working on the Mars Treaty and for a mechanical engineer like me this is an outstanding experience because it taught me to think outside the box on space policy! Even more the Artificial Gravity team project, we literally design a new space station, and this is something I really want to continue doing after SSP16. I'm really grateful with all my new friends and colleagues, they have taught about respect, tolerance and cooperation despite cultural differences, this is something I want to take back to my country!

Camilo Andres Reyes, Colombia

SPONSORSHIP & SUPPORT

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Host Institution

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Asher Space Research Institute

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Haifa University
ImageSat International (ISI)
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Individual Supporters

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Michael Potter
Roger Pierce

ISU SSP16 has been supported at the local level by the following organizations:

Israel Space Agency (ISA)

The Israel Space Agency's goals include advancing infrastructural research at academic and research institutions; supporting the development of innovative and unique space technologies by Israel Aerospace Industries; cultivating a new generation of space scientists through space education and community projects; and encouraging the expansion and growth of Israel's space industry. ISA activities emphasize the importance of scientific research and development and support projects with substantial economic potential. Due to a major budget increase that the Ministry of Science and Technology received in 2012 for space research, the ISA has begun to advance a national space program aimed at enhancing Israel's comparative advantage and placing it among the world's top five countries in the field of space research and exploration.

Ministry of Science, Technology and Space of Israel

In accordance with Government Decision of January 6, 2008, pertaining to state commemoration of the first Israeli astronaut, the Ministry of Science and Technology perpetuates the memory of Col. Ilan Ramon, who served as Israel's ambassador in space, through educational programs, competitions and quizzes on space-related topics, and via scholarships for research projects and for continuing education in space science at relevant academic institutions. The Ministry coordinates and operates the programs via the governmental Ramon Foundation and in cooperation with the private Ilan and Asaf Ramon Foundation and other partners. The Foundation also strives to cultivate Israeli excellence and innovation, and operates programs aimed at fostering personal and social excellence through the media of aviation, space, science and technology.

City of Haifa

Haifa is a northern Israeli port city built in tiers extending from the Mediterranean up the north slope of Mount Carmel. The city's most iconic sites are the immaculately landscaped terraces of the Bahá'í Gardens and, at their heart, the gold-domed Shrine of the Báb. At the foot of the gardens lies the German Colony, with shops, galleries and restaurants in 19th-century buildings.Haifa is a multi-faceted city with several unique characteristics making it an attractive place to visit. Its proximity to the sea and its active port contribute to its prominence. The bustling port area draws merchants, shoppers and tourists. The beautiful beaches are popular for sports and recreation, and are filled with people during summer weekends.

Adelis Foundation

The Adelis Foundation was established in 2006 by André Deloro, who chose to dedicate his fortune to the growth of the Jewish nation and the support of the State of Israel. The Foundation carries out Mr. Deloro's vision by supporting ground breaking projects and ventures for the future of the State of Israel. It particularly encourages excellence among institutes of higher education in Israel, which specialize in scientific and medical research. Space research is one of the flagship projects of the Foundation.The Adelis Foundation also supports projects in the areas of education, welfare in the peripheries of Israel, Zionism and Jewish heritage.

Israel Aerospace Industries Ltd.

Israel Aerospace Industries Ltd. is a globally recognized leader in the development and production of systems for the defense and commercial markets. IAI offers unique solutions for a broad spectrum of requirements in space, air, land, sea and cyber.IAI is the largest government owned defense and aerospace company in Israel. Over the past 60 years IAI delivered, supplied and supported advanced systems for the Israeli Ministry of Defense as well as many demanding customers worldwide.

Rafael Advanced Defense Systems Ltd.

Rafael Advanced Defense Systems Ltd. designs, develops, manufactures and supplies a wide range of high-tech defense systems for air, land, sea and space applications for the Israeli Defense Forces and the defense establishment, as well as for foreign customers around the world. The company offers its customers a diversified array of innovative solutions at the leading edge of global technology. Rafael is the largest employer in Northern Israel with approximately 7,000 employees and numerous subcontractors and service suppliers. It is Israel's second largest defense company.

Elbit Systems Ltd.

Elbit Systems Ltd. is an international high technology company engaged in a wide range of defense, homeland security and commercial programs throughout the world. The Company, which includes Elbit Systems and its subsidiaries, operates in the areas of aerospace, land and naval systems, command, control, communications, computers, etc. The Company also focuses on the upgrading of existing platforms, developing new technologies for defense, homeland security and commercial applications and providing a range of support services, including training and simulation systems.

El Al Israel Airlines Ltd.

El Al Israel Airlines Ltd. is the flag carrier of Israel. Since its inaugural flight from Geneva to Tel Aviv in September 1948, the airline has grown to serve some 45 destinations, operating scheduled domestic and international services and cargo flights to Europe, North America, Africa and the Near and Far East from its main base in Ben Gurion International Airport.

ImageSat International

The company is a global leader in end-to-end geospatial solutions. Their solutions help their clients obtain high resolution satellite earth imagery, conduct viable data analysis and gain actionable insights, to better understand and act upon their geo-political, environmental and economic realities.With over 20 years experience in space imagery production and analytics, innovative technology and a multi-source data acquisition network, ImageSat delivers high quality data, reports and research insights.

DIRECTOR'S RETROSPECTIVE

International Space University's 29th Space Studies Program can be characterized by the term "exploring new boundaries"- geographical, academic and temporal. This was the first SSP to be hosted in the Middle East, and the Technion – Israel Institute of Technology proved to be an excellent host institution. Our location on the historical slopes of Mount Carmel, overlooking the city of Haifa, added a sense of millennia-old history to our study of the decades-old space age. SSP students took advantage of the rich history of Israel and the surrounding States to explore sites important to many of the World's religions, and well-preserved archaeology of many of this region's past civilizations. At the same time, they were offered the opportunity to visit much of the Israeli space industry, gaining insight into spacecraft, space operations, and technology programs that are all self-contained within this high-tech nation.

This year's academic program was compressed a bit to accommodate a number of calendar constraints. The result was a program that was overflowing from the Opening Ceremony to the final Team Project Presentation, and challenged participants, faculty and staff to maintain "high g's" for the full 8 weeks. Participants heard Core Lectures from astronauts, space agency managers and experts from around the world. In the evenings they listened to distinguished lectures and panels covering the breadth of the space sector. We will never forget that ISU Chancellor and Apollo 11 astronaut Buzz Aldrin came to speak to us, or the spouses of the Columbia mission telling us their intensely personal stories. We'll remember each of the academic Departments for helping us explore the human body in space, robots on Mars, or the complexities of international negotiations. And we will certainly never forget our three Team Projects – each a different challenge, but all taught us how to work together in a complex, stressful, international, intercultural environment.

In the end, the Space Studies Program is equal parts academics, professional networking, international/intercultural professional development, and immersive social experiment. It takes over 100 participants from around the world who have never met and, through the shared experience of the SSP, transforms them into a group of lifelong friends. The future leaders of the space sector emerge from this experience with a unique perspective of how the future of space should be shaped. SSP16 in Haifa has followed the proud tradition of the 28 SSPs that have preceded it, and we will always cherish the memory of the summer we spent in Israel, exploring new boundaries, both in space and within ourselves.

John F. Connolly, SSP16 Director

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