International Space University

Space Studies Program 2016

Program Handbook

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ISU SSP16 is 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.

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Introduction

ISU Credo

We, the founders of the International Space University, do hereby set forth this Credo as the basis for fulfilling ISU's goals and full potential.

International Space University is an institution founded on the vision of a peaceful, prosperous, and boundless future through the study, exploration, and development of Space for the benefit of all humanity.

ISU is an institution dedicated to international cooperation, collaboration, and open, scholarly pursuits related to outer space exploration and development. It is a place where participants and faculty from all backgrounds are welcomed; where diversity of culture, philosophy, lifestyle, training, and opinion are honored and nurtured.

ISU is an institution that recognizes the importance of interdisciplinary studies for the successful exploration and development of space. ISU strives to promote an understanding and appreciation of the Cosmos through the constant evolution of new programs and curricula in relevant areas of study. To this end, ISU will be augmented by an expanding base of campus facilities, networks, and affiliations both on and off the Earth.

ISU is an institution dedicated to the development of the human species, the preservation of its home planet, the increase of knowledge, the rational utilization of the vast resources of the Cosmos, and the sanctity of Life in all terrestrial and extraterrestrial manifestations. ISU is a place where participants and scholars seek to understand the mysteries of the Cosmos and apply their knowledge to the betterment of the human condition. It is the objective of ISU to be an integral part of humanity's movement into the Cosmos, and to carry forth all the principles and philosophies embodied in this Credo.

This, then, is the credo of ISU.

For all who join ISU, we welcome you to a new and growing family. It is hoped that each of you, as leaders of industry, academia, and government will work together to fulfill the goals set forth herein. Together, we shall aspire to the Stars with wisdom, vision, and effort.

12 April 1995

ISU Founders:

Peter H. Diamandis
Todd B. Hawley
Robert D. Richards

ISU Founders: Peter H. Diamandis, Todd B. Hawley, Robert D. Richards

Welcome to ISU Space Studies Program 2016

As expressed in the aforementioned vision, ISU is constantly trying to expand its international character. It is therefore particularly interesting to be able to be present in an area where ISU has never been before, as it expands the global character of the University.

We were pleased to have received an offer from the Middle-East area, a part of the world where no previous SSP had ever taken place. In addition to this, the offer came from one of the most reputed universities worldwide, Technion in Haifa.

Technion was officially founded on 11 April 1912 (just one day too early to fall in the famous space series of 12 April events later…), originally under the name Technikum. The University expanded rapidly in different disciplines and now has over 100,000 alumni including several Nobel Prize winners. With campuses in New York, USA and Guangdong, China, its international character corresponds closely to ISU's vision. Its scientific and technical reputation has grown constantly, and in 2015 the well-known Shanghai Academic Ranking rated the Technion as 77th in its list of the top 100 universities in the world.

One of the notable Technion Institutes in the field of space applications is the Asher Space Research Institute (ASRI), with among others a world-wide reputation in the fields of electrical propulsion and interferometry. Several microsatellites were produced in this center with the comprehensive involvement of students.

Technion is THE place to be for space enthusiasts this summer, and I am sure they will be impressed by its technical infrastructure and international environment.

Looking forward to meet many students from all around the world in Technion!

Walter Peeters
President, ISU

Welcome to SSP16 and prepare to make history with us!

It is my pleasure to welcome everyone to the ISU session hosted by the prestigious Technion - Israel Institute of Technology in Haifa. This 29th session of the ISU's Space Studies Program will make history not only as ISU's first program in this region, but also by the many amazing activities that every participant will experience.

We have packed this year's schedule with intense academics, distinguished guest lecturers, insightful professional visits, and plentiful social activities.

This year's SSP will host astronauts from around the world, provide a memorable viewing of the Perseid meteor shower, a Guinness world record attempt of (sorry, can't tell you any details yet, you'll need to be here to find out!), and much more. We'll host the classes, lectures and workshops in world-class facilities, and we'll dine on cuisine from around the world. We'll all experience the best of the Israeli academic environment while at the same time experiencing the best of Israeli hospitality.

The Faculty, Staff and Local Organizing Committee have been working tirelessly for almost two years to make this year's SSP one of the most memorable ever. Our Technion hosts, working with our SSP16 partner organization, the Israeli Space Agency, have worked diligently to address every part of the ISU experience to make SSP16 safe and memorable.

The Technion University and the city of Haifa form a perfect international backdrop for our program, and SSP16 is pleased to be hosted by Israel's oldest university. Haifa's peaceful intermingling of nationalities and cultures in many ways reflects ISU's very own international, interdisciplinary and intercultural credo.

I look forward to personally getting to know all of you during these next two months, both in the classroom and at one of our many evening events. I cannot promise that you will get enough sleep, or that the program will be free of stress, but I can promise you will gain a new perspective on all things about space, and that after two months you'll leave exhilarated, exhausted, and part of an amazing new family.

John F. Connolly
SSP Director, ISU/NASA

SSP16 Host Institution

Israel Institute of Technology

Technion – Israel Institute of Technology is located in Haifa. Israel's first university, the Technion opened its doors in 1924 and began the historic task of preparing young men and women to build a new nation. After more than 85 years of academic excellence and boldly inventive research, the Technion commands a worldwide reputation for its pioneering work in a full range of 21st century disciplines, including aerospace, microelectronics, communications, computer science, superconductivity, fiber optics, optoelectronics, water- resource development and management, catalysis, nanotechnology, biotechnology, the life sciences and medicine, and more.

In 2014, the Technion ranked in the top 50 universities in the world according to the 2015 ARWU – Shanghai Rankings. Technion ranked 6th in Entrepreneurship & Innovation, 18th in Computer Science, 38th in Science, 44th in Engineering.

The Technion has a distinguished faculty of 536 that includes two Nobel Prize-winning scientists. These faculty members collaborate with leading scientists on research projects worldwide. The campus houses 40 research institutes and centers and nine interdisciplinary centers of excellence. Visiting academics and overseas graduate students provide an international atmosphere. Paving the way from the laboratory to the marketplace, the Technion, through its R&D Foundation, has nurtured dozens of start-up companies.

The Technion is committed to building – in every sense of the word. The Institute helps engineer not only structures, machines and materials, but also a better and brighter future for Israel and the world at large. The Technion has awarded 90,000 degrees, and these engineers, scientists, doctors, and architects have played an essential role in laying the country's infrastructure and establishing its high-tech industries, which are vital for Israel's survival and economic growth.

Welcome from the Mayor of Haifa

On behalf of all of Haifa's residents, it is my genuine pleasure to welcome you to our city.

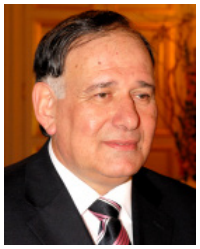
Haifa is home to 300,000 residents who live in peace and harmony in this special and extraordinary place. For over 100 years, members of all religions have been living amicably together: Muslims, Christians, Achmads, Druze, Baha'is and Jews. The city is one of Israel's high-tech centers with R&D divisions from all major companies – Intel, Microsoft, Google, IBM and more.

The City of Haifa was graciously endowed with spectacular landscapes. The urban side of the city stretches down from Mount Carmel, where Technion's main campus is located, to Haifa Bay, whose green-blue waters border the city on the west and hug the long sandy beaches on the south. On the other side, the city is bounded by thriving green forests – Carmel Park – the largest green area in Israel.

Haifa is home to two universities – Technion-Israel Institute of Technology and Haifa University. Three Technion scientists, Professors Aaron Ciechanover, Avraham Hershko and Dan Shechtman brought considerable pride to both the city and the country by receiving the Nobel Prize in Chemistry.

We are truly delighted to be hosting you here with us in Haifa. We hope that you will tour our city. Stroll along the sandy beaches, and take a walk down our famous pedestrian promenade, which starts at Yaffe Nof Street, winds down through the beautifully terraced Baha'i Gardens – declared by UNESCO as a World Heritage Site, and passes through the restored historic German Colony, a popular tourist attraction, and ends in Haifa Port.

On behalf of the residents of Haifa, I would like to wish you a pleasant stay in our city and fruitful studies in the ISU-SSP.



Yona Yahav
Mayor of Haifa

Welcome from the SSP16 Host Institution

Welcome to the Technion-Israel Institute of Technology!

We are thrilled to host the International Space University (ISU) 2016 Space Studies Program. This year marks the first time the Space Studies Program is taking place in Israel and there is no better place for it than the Technion in Haifa.

Founded in 1912, Technion is Israel's oldest university. A leading science and technology research university and a major world center for applied research, Technion is one of the first universities worldwide to launch a satellite and maintains an active space program. Technion faculty and graduates play a major role in Israel's advanced and vibrant aerospace industry.

Our reputation in combining excellent academic and research practices with a unique atmosphere that encourages and nurtures innovation and entrepreneurship among students and faculty, has made Technion a coveted destination for international students. I'm sure you will interact with some of them on campus.

We look forward to your stay with us and hope that while here you will have the opportunity to experience first-hand some of Technion's scientific achievements, as well as the beauty and culture of Haifa and Israel.

I would like to wish each and every one of you an enjoyable and productive summer!

Prof. Peretz Lavie
President, Technion

(Photo credits: Annie Tritt)

Welcome from Local Organizing Committee

On behalf of the Local Organizing Committee (LOC), welcome to the campus of the Technion and the City of Haifa. We have worked hard to ensure that the 2016 Space Studies Program (SSP16) will engage and inspire you.

In our planning, we were motivated by the support and collaboration of many individuals and organizations from Technion, the City of Haifa, the State of Israel, and International Space University -- all of whom have brought their expertise to make SSP16 a success. We hope you come to love our campus and its resources, and return again to take advantage of its numerous academic opportunities.

We offer you a friendly, welcoming atmosphere during your intensive academic studies as well as in your leisure time. We encourage you to use campus resources, visit local businesses and regional attractions, and explore the recreational activities and scenic beauty of our city.

I am delighted to welcome you to SSP16 as Director of Technion's Asher Space Research Institute, which serves as the lead organization for space research and education at the Technion. We have much to offer you, and to learn from you, and hope that your stay with us will open a new realm of possibilities in your life and in your career.

It is an honor to host SSP16. Each LOC member wishes you academic success, personal growth, and a wonderful stay.

Prof. Pini Gurfil
Chair, SSP16 Local Organizing Committee
Director, Asher Space Research Institute

Program Structure

Overview

The SSP is an intensive professional development course for postgraduate participants, as well as for young and seasoned professionals of all disciplines. It is a unique educational experience with a curriculum that covers the principal space-related fields, both technical and non-technical. The topics range from engineering, physical sciences, and space applications, to life sciences, policy, management, business, and humanities.

The shared experience of an international, intercultural, and interdisciplinary working environment is an ideal networking forum. The ISU alumni, numbering over 4,000 to date, along with the faculty members and visiting lecturers, have created an extensive, international, multidisciplinary professional network. Through the exchange of ideas and information, this network has been successful in advancing a range of projects - including disaster warning and mitigation systems, human health enhancement using space technologies, and solar system exploration - and has contributed significantly to the creation of one national space agency.

The interdisciplinary curriculum offered in the SSP, with its emphasis on international cooperation, exposes participants to broad new perspectives on world space activities that might otherwise be reserved for those with many years of diverse professional experience. The program is packed with a wide variety of activities including lectures by renowned experts, hands-on activities and projects, team work assignments, and professional visits. Each year the program evolves to better meet the needs of the participants and their employers.

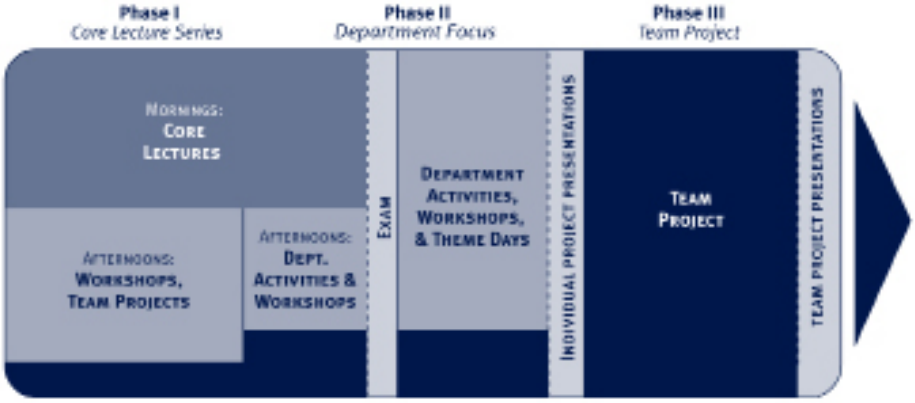
All ISU programs are conducted in English. Participants are strongly encouraged to contribute their own knowledge, experience, ideas, culture, and opinions, as well as their energy and enthusiasm. It is expected that participants reflect the ISU pedagogical approach and vision, promoting interest in and respect for different cultures and backgrounds.

The SSP is organized into three interrelated phases;
Phase I – Core Lecture Series,
Phase II – Departmental Activities,
Phase III – Team Project.

The three phases are divided into academic elements on which each participant's performance is assessed. The main academic elements for which assessment marks are assigned include the Core Lecture quizzes and exam, Department performance, and the Team Project (TP) performance. Each academic element includes a number of sub-elements, which will be described in subsequent sections of this Handbook. The workshop is a key part of the program, but is not assigned performance marks.

Phase I: Core Lecture Series

The core curriculum of the SSP consists of the core lectures and the fundamental workshops. The Core Lecture Series and associated workshops ensure that participants have a basic grounding and common knowledge in the fundamentals of all the disciplines that are relevant to space programs. It also serves to ensure that participants understand the relationships among the various disciplines in any space-related activity. All participants attend the core lectures and fundamental workshops, which create the basic framework of knowledge to



SSP Academic Program Overview

prepare them for informed and balanced judgment and subsequent teamwork.

Each major aspect of space activity is presented in a series of lectures designed primarily for non-experts; thus, medical specialists can understand the lectures on propulsion, and engineers and lawyers can understand the lectures on the effects of weightlessness on the human body. The lectures do not go into depth or enter into significant detail in any subject, except, perhaps, to illustrate a point. The great breadth and diversity of the subjects means, however, that a large quantity of material is covered. Many core lectures are grouped around clusters or themes to highlight the interrelation among disciplines. Questions by participants and group discussions with the lecturers are encouraged.

Three or four core lectures are presented each day for a period of four weeks, which requires a certain amount of stamina on the part of the participants. At the end of the Core Lecture Series, however, when the whole picture can be pieced together, participants always agree that they have gained a valuable, new, and exciting perspective on space activities.

Lectures are 60 minutes in duration, including 10 minutes reserved for questions. Lecturers know that their presentations are aimed at non-specialists and that, for many participants, English is not their first language.

Participants are expected to attend all lectures, including the lectures in their own area of specialization. There are two key reasons for this. First, it is important when the teamwork activities begin that everyone knows exactly what information on the various subjects has been presented. Second, participants who are more knowledgeable in a particular subject are better placed to offer informal help to fellow participants who may be experiencing difficulty.
Lecturers are expected to speak slowly and clearly, to avoid colloquialisms, and to explain specialized language or jargon. The lecturers greatly appreciate signals from the participants when they begin to speak too quickly or introduce difficult language without explanation. Feel free to ask questions for clarification during the lectures.

As a study aid, PDF files of the core lecture presentations are provided to all participants in electronic format upon their arrival at registration.

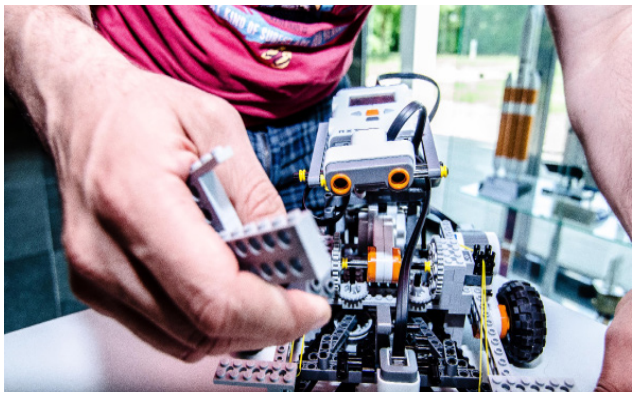
Workshops (WS)

Fundamental and elective workshops are offered during Phases I and II. All participants take part in the fundamental workshops during the early weeks of the program. The elective workshops are then offered in parallel.

SSP workshops are designed to enhance and complement the knowledge acquired during the core lectures through more active learning in smaller groups. The workshops allow greater interaction and individual learning.

There are three fundamental workshops that are required for all participants: Team Project Management and Foundation Skills, Report Writing and Presentation, Team Building and Media Training and Crisis Communications. Participants will rotate through the first three of these workshops in their TP group, and will attend in one group at the last workshop.

Elective workshops are based on personal interests, which provide opportunities to broaden interdisciplinary skills. Participants must sign up for their selected workshops in advance, using an online selection tool. Participants who do not sign up will be assigned to a workshop. Descriptions of all workshops are provided on page 38.



Phase II: Department Focus

The SSP is structured around seven academic departments and three TPs. This organization provides an anchor that allows smaller groups of participants to focus on

a particular discipline of interest as they learn. Each participant chooses a department during the first weeks of the program.

The SSP Departments are:

- Space Engineering (ENG)
- Space Sciences (SCI)
- Human Performance in Space (HPS)
- Space Applications (APP)
- Space Management and Business (MGB)
- Space Policy, Economics, and Law (PEL)
- Space Humanities (HUM)

Participants are encouraged to select a department in which they may not have significant background or expertise. At SSP, it is important to try new things to broaden your background.

Specific departmental sub-elements include department activity participation, individual or small team assignments, and professional visits. Details for the departmental activities and professional visits are provided beginning on page 24.

Department Activities (DA)

The Departmental activities provide deeper examination of some of the topics covered in the core. The groups are smaller than in the core lectures, thus allowing for exchange of knowledge, ideas, and opinions, as well as hands-on activities. The department activity slots provide an important opportunity for participants to interact with faculty members, visiting lecturers, and Teaching Associates to build their professional network. These activities provide a means for participants to become sensitized to the cultural differences that govern personal interactions in a group setting, and to adapt and develop presentation and negotiation skills in light of this cultural diversity.

(SSP15 professional visit to Ohio University Airport)

Professional Visits (PV)

During some department slots, participants make professional visits to space-related institutes and organizations. The specific activities vary based on the available local resources and the overall program plan developed by the Department Chair.

(SSP14 professional visit to Canadian Space Agency Mars Yard)

Individual or Small Team Assignments

The Department Chair will assign a short exercise, experiment, or project to meet the requirements for the department evaluation (see the Evaluation and Conduct sections). This assignment will be fully explained to, and developed with, each participant during a personal interview with the Department Chair. The topic of the individual or small team assignments will be coordinated between the participant(s) and the Department Chair.

Assignments may be done individually or in small groups. Assignments may take the form of an oral presentation; a professional paper and/or poster; constructing an experiment, gathering data and interpreting the results; or answering a request for proposal. The nature of the assignment will be commensurate with the overall learning objectives and department academic plan set out by the Department Chair.

Phase III: Team Project (TP)

To develop the TPs, participants work in interdisciplinary and intercultural groups to produce comprehensive analyses and proposals regarding an international space project or a topic of relevance in the space sector. Participants choose one of the TP topics and work on that topic for the duration of the SSP session. When the TP work requires specific information, participants can turn to their departmental experts.

The TP element of the SSP has three main objectives as described below:

1. To encourage participants to put into practice what they have brought from their own educational or professional background, plus the knowledge and skills they learn from lectures, workshops, and other

presentations during the SSP session.

2. To experience decision-making, organizing, and working in sub-teams, as well as to learn how to come to solutions and recommendations while working in interdisciplinary and intercultural teams, in which conflicting requirements emerge and compromises must be negotiated.
3. To produce a comprehensive report of professional quality and deliver the results in a formal public presentation. The TP report covers all aspects of the topic including, but not limited to: technical, financial, organizational, political, social, and business. Many ISU reports have served as resources for the world space community.

TP Structure

The structure of a TP depends to some extent on its subject matter, but certain aspects are common to all TPs, including:

- An early phase of exploratory research or brainstorming discussions about the project;
- A series of factual lectures specific to the TP topics;
- An intensive research and fact-finding period;
- A challenging period of assessing the different ways to organize the study effort;
- Extensive opportunities for engaging departmental faculty members and lecturers in discussions associated with TP issues;
- An interim presentation where expert advice and comments are provided by reviewers; and
- A period of very intense work to complete the Team Project Plan, Final Report, Executive Summary, and the Final Presentation.

Each TP team must analyze and respond to at least the tasks outlined in the TP descriptions in this Handbook. Innovative solutions and creativity are encouraged, but team members must ensure that all of the topics detailed in the guidelines in the following section have been addressed.

Deliverables

Just as in any international space project, and to ensure quality control and accuracy, there will be a set of required (marked) deliverables. These include a Team Project Plan, Executive Summary, Final Report, and Final Presentation. These deliverables, along with the participant's individual TP performance mark, comprise the sub-elements of the TP.

An internal review of the project in the form of a presentation convenes at Week 7. The internal review presentation is not marked because the intent is for the faculty and visiting experts to provide any final guidance needed before the project approaches completion.

When developing the Final Report and Executive Summary, the TP Requirements document, which is a separate document provided as part of the SSP academic materials, shall be followed. Failure to do so shall result in an automatic deduction from the Final Report mark. Each TP may involve the development of other deliverables specific to that TP. These additional deliverables are not marked and are specified in the TP descriptions.

Team Project Plan

The Team Project Plan is a useful tool that defines the direction of the team. It allows the team members to come together and organize for the execution of the project. The team will develop a mission statement, an outline of the project, create a work breakdown structure that will detail how the work is distributed among the team members, and complete a detailed schedule. The Team Project Plan is submitted to the TP Chair and the SSP Director in accordance with the deadline indicated in the SSP schedule. The team will be provided with constructive feedback and comments on the proposed direction of the project. The Team Project Plan is limited to 15 pages.

Executive Summary

The Executive Summary is a document that is up to 16 pages in length and is produced both in printed color copies and in electronic format. It provides a succinct high-level summary of all aspects of the TP with emphasis on the outcomes and their applicability. The Executive Summary must be submitted to the TP Chair and the SSP Director in accordance with the deadline indicated in the SSP schedule.

Final Report

The Final Report is the written end product of the team's effort. It must adhere to the TP Requirements document, which is separate from this Handbook. The

Final Report is a professional quality document limited to 126 pages that clearly and concisely describes the team's effort and the outcome of the project. It is produced only in electronic format, a copy of which is provided to all participants at the end of the program. The Final Report is submitted to the TP Chair and the SSP Director in accordance with the deadline indicated in the SSP schedule.

Final Presentation

The team will develop and deliver a formal presentation of the Final Report to the faculty, chairs, fellow SSP participants, staff, and invited experts. Teams are encouraged to make full use of available technology to provide an informative and engaging detailed presentation of the work they have accomplished. Non-traditional, creative presentations are encouraged.

Topic Selection Criteria

In selecting specific topics and tasks in the TP work breakdown structure, the team is expected to apply the following criteria.

- **Workable**: Generating a complete, integrated product with clear conclusions in SSP weeks
- **Realistic**: Technically, economically, and politically feasible
- **Innovative**: Likely to stimulate new and unprecedented ideas
- **Focused**: Having clearly defined and stable objectives
- **Enabling**: Advancing plans and capabilities for novel technical solutions
- **Fostering teamwork**: Stimulating argument and drive toward consensus
- **Interdisciplinary**: Engaging the talent and energy of participants in all ISU disciplines
- **International**: Inherently requiring a cooperative multinational approach
- **Beneficial to team**: Useful to participants as alumni in their later careers

Post-SSP Team Project Activities

ISU alumni regularly present the results of SSP TPs at international conferences and meetings, such as the International Astronautical Congress (IAC) and conferences at the United Nations. Groups of participants and faculty have also worked to turn TP reports into real-world studies for space agencies and research institutes.

Each year SSP TP Chairs and the Teaching Associates prepare abstracts that are submitted to the IAC, where the TP Chairs and TAs are identified as the primary authors of the papers. This is because the submission dates are significantly earlier than the start of the SSP session. All TP team members are identified and acknowledged in the final submitted published paper.

ISU provides a small budget of 500€ to each TP group to defray the cost of participant travel to a conference or symposium for the purpose of delivering a TP-related presentation. The funds may be provided to one participant or split among several at the discretion of the TP Chair.

(SSP15 Class Photo on Opening Day)

Academic Performance Evaluation

Evaluation

The SSP evaluation has three elements:

1. Core lecture midterm quiz and final examination;
2. Departmental performance, including individual or small team assignment;
3. Team Project performance.

Academic Elements	Final Grade Weighting
Core Quiz and Examination	1/3
Departmental Grade	1/3
Team Project Grade	1/3

The composite SSP evaluation will be given a corresponding Letter Grade as follows:

Letter Grade	Description
A	Excellent
B	Very Good
C	Good
D	Acceptable
F	Fail

Participants must achieve at least an Acceptable (D) evaluation in each of the three elements to earn a Certificate of Completion for the SSP, as explained in this section and in the Academic Guidelines and Code of Conduct chapter. Participants should familiarize themselves with these guidelines. At the beginning of the Space Studies Program, each participant will be asked to sign an agreement confirming full understanding of the terms and conditions contained in the guidelines.

Core Curriculum Examination

Midterm Quiz

A short quiz will be administered halfway through the Core Lecture Series. Specifically, the quiz will be scheduled during the first time slot on the Sunday of Week 3. The quiz will cover all material presented during Weeks 1 and 2 of the Core Lecture Series (it will not include lecture material presented in Weeks 3 and 4). The questions on the quiz will include multiple choice, fill-in-the-blank, or short answer (one sentence). The quiz will be disciplinary in nature, meaning that questions will assess understanding of key concepts from each core lecture, rather than synthesizing information across lectures.

Final Exam

The Final Exam is administered at the end of the Core Lecture Series on the Tuesday of Week 4. It will consist of two parts, (A) disciplinary quiz, and (B) interdisciplinary essay exam. Both parts will be administered in sequence and timed during one examination sitting.

The disciplinary quiz (A) will be conducted similar to the Midterm Quiz, consisting of disciplinary quiz questions in multiple choice, fill-in-the-blank, or short answer formats. The quiz will cover material presented during Weeks 3 and 4 of the Core Lecture Series only.

The interdisciplinary essay exam (B) will be administered directly after the disciplinary quiz. The essay exam will cover all lecture material in the Core Lecture Series (Weeks 1 to 4 inclusive). It will consist of three (3) interdisciplinary questions of which two (2) must be answered. It is the participant's choice as to which two questions are addressed. The questions are designed to assess the participant's ability to synthesize the information presented in the core lectures to address a multifaceted interdisciplinary topic reflecting both technical and non-technical content.

The exam will be derived from the material in the core lectures only. To be fully prepared, participants should study the presentation materials, Core Lecture Study Notes (CLSNs), and notes taken during the lectures.

Quiz and Exam Assessment

The Midterm Quiz and Final Exam results together comprise the core curriculum performance assessment (i.e., the Core Grade). A detailed assessment briefing will be presented on the first day of the Core Lecture Series.

The Midterm Quiz will be worth 25% of the Core Grade. Each question is worth one point and the Midterm Quiz grade is recorded as a percentage score. If a participant misses the Midterm Quiz, there will be no opportunity to take the quiz and a score of zero (0) will be given for the missed quiz.

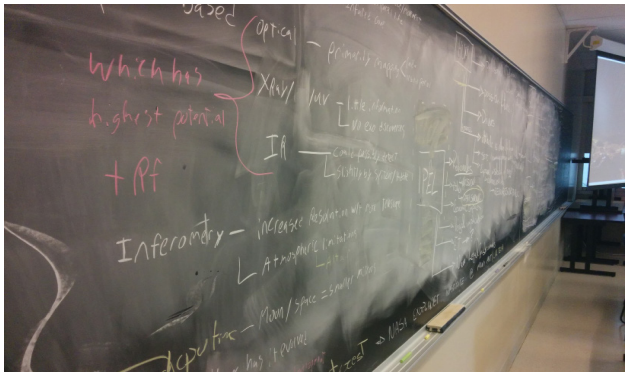
The Final Exam will be worth 75% of the Core Grade. Specifically, the disciplinary quiz will be worth 25 points (25 questions worth one point each). The interdisciplinary essay exam section will be worth 50 points: 25 points for each of the two questions that the participant chooses to answer.

Core Curriculum Evaluation Components		Percentage
Disciplinary Midterm Quiz		25
Final Exam	Disciplinary Quiz	25
	Interdisciplinary Essay	50
Total		100

The Core Grade will be determined by the weighted sum of the participant's Midterm Quiz score and the Final Exam score. A final score of at least 50% is required to achieve an Acceptable performance level.

A re-sit exam opportunity will be provided to any participant who does not achieve an Acceptable performance level on the Core element. Should a re-sit be required, the total core element grade is limited to a maximum of 50% (Acceptable). No re-sit examination will be arranged in the case where all participants achieve an Acceptable performance level on the Core element.

Exam grades will be available no later than Week 5. Participants may review their graded exam through a request to the Academic Coordinator. Grades may not be contested after Thursday of Week 6.



Department Evaluation

The final department performance assessment is based on three sub-elements, which include the following:

- An assessment of the individual or small group assignment topic, proposal, or abstract, which is to be submitted in writing no later than Sunday of Week 6. (10%)
- An assessment of the participant's individual or small group assignment final paper, presentation, or whatever form of deliverable as agreed upon with the Department Chair. At the beginning of Phase II, a topic for the individual/small group assignment will be discussed and agreed upon by the individual/group and the Department Chair. The Department Chair will evaluate the assignment and specify the deliverables associated with it. They may designate other individuals to mark the assignment, including Department Faculty, Visiting Lecturers, and the Teaching Associate. Particular attention will be given (as appropriate) to the amount, quality, and content of work; grasp of the subject; bibliography; and the overall organization, clarity, coherency, consistency, style, originality of methods, initiative, imagination, and critical analysis. (40%)
- An assessment of the participant's involvement in and contribution to department activities, which may take into account feedback from other SSP Faculty members and the Teaching Associate; other products of the assignment or departmental work; and follow-up discussions with the participant, when appropriate. Participants are expected to attend all departmental activities and, at the discretion of the Department Chair, may be marked down five (5) points or more per absence. At the discretion of the Department Chair, a peer review process may be used as an element of the evaluation. (50%)

Department Evaluation Components	Percentage
Assignment Abstract	10
Assignment Submission	40
Participation	50
Total	100

Team Project Evaluation

In assessing each participant's performance in the TP activities, the TP Chairs and Faculty will take into consideration the following factors:

- The ability of the participants - both individually and collectively - to work within, and lead teams; communicate one-on-one and in group meetings; define project objectives and ensure their fulfillment; perform successfully the project parts assigned to them; gather, utilize, and integrate knowledge gained in all aspects of the SSP; provide innovative ideas in order to achieve the objectives of the TP; deliver effective reports and presentations
- The importance, relevance, and completeness of

the bibliographic search and literature survey

- The timely development and submission of the Team Project Plan
- The quality of the Final Report, the Executive Summary, and the Final Presentation; innovative ideas, completeness of the contents, overall organization, clarity, critical analysis, coherence, and consistency

Each participant's contribution and individual overall mark for the TP will be based on the following five sub-elements, four of which are the major TP deliverables.

1. The Team Project Plan (team mark - the same mark for each participant)
2. The Final Report (team mark - the same mark for each participant)
3. The Executive Summary (team mark - the same mark for each participant)
4. The Final Presentation (team mark - the same mark for each participant)
5. The individual contribution of each participant (a separate evaluation will be made for each participant)

The assessed TP sub-element point values and weighting are summarized in the table below.

TP Evaluation Components	Percentage
Team Project Plan (team)	10
Final Report (team)	25
Executive Summary (team)	10
Final Presentation (team)	15
Individual Contribution	40
Total	100

Specific evaluation criteria for each of the deliverables will be provided during the SSP session.

Points are deducted from the Final Report mark for either or both of these factors:

- The report is submitted late (10 point deduction)
- The report does not comply with the ISU TP Report Requirements (10 point deduction)

A participant's individual contribution mark will be based on a combined evaluation of oral interviews and general observations. At the discretion of the TP Chair, a peer review process may be used as an element of the evaluation.

Transcript, Certificate of Completion, and Letter of Participation

Upon successful completion of the SSP, participants receive a transcript of their results and a Certificate of Completion. Transcripts will reflect all elements of the SSP performance assessment, and will include an overall mark for the SSP based on an even weighting of the three evaluation elements. The SSP Certificate of Completion will be awarded only to those participants who achieve a pass (a mark of 50% or above) in each of the three assessed elements. That is, passing marks of 50% in the Core, 50% in the Department, and 50% in the TP to obtain an SSP Certificate of Completion. A Letter of Participation will be issued to those participants who complete the program but do not obtain an overall passing mark.

Official copies of the SSP transcript may be obtained via an online order service on the ISU website at www.isunet.edu. Transcripts will not be provided to third parties without the written authorization of the individual participant. At the end of the program, participants will be given an unofficial copy of their transcript as a record of their performance.

Academic Credit

Participants who have successfully completed the SSP are eligible for a waiver for Module 1 of the ISU Master of Space Studies (MSS) program. The condition of eligibility is as follows: if an SSP participant earns an SSP Certificate of Completion and scores in the top 50% of the class, they are eligible to apply for a waiver for Module 1 of the Masters program. If a participant is in the bottom 50% and admitted to Masters program, then he or she may place a module waiver request with the President for adjudication. The President's decision is final and may not be appealed.

ISU programs are not accredited. However, the French Ministry of Education has formally recognized ISU as an institute of higher education in France through the decree MENS0400386A of 27 February 2004.

Conduct

Academic Guidelines

Attendance

Participants who miss five (5) days or more of the course will not receive a Certificate of Completion unless exceptional circumstances apply, and will instead be issued a Certificate of Participation. If exceptional circumstances apply, a determination will be made by the SSP Director in consultation with the Academic Coordinator and the participant's Department and TP Chairs.

Participants who leave the program before its completion, and who have maintained good academic standing, will be issued a letter from the SSP Director describing the extent of their participation.

Withdrawal

Any participant who is not undergoing disciplinary proceedings may petition for early withdrawal from the program. Petition for withdrawal must be submitted in writing to the SSP Director.

Upon receipt of the written request, the petition for withdrawal will be decided upon by the SSP Director, in consultation with the Academic Coordinator and the participant's Department or TP Chair.

If the petition for withdrawal is approved by ISU, the participant may then request to be readmitted to the following session of the Space Studies Program.

Participant Responsibilities

The International Space University experience is a composite of knowledge gained through formal methods such as lectures, as well as through more informal channels of discussion and participation in activities inside and outside of the classroom. In addition, ISU seeks to develop each participant's capabilities, network of associates, and interpersonal skills in small and large group settings.

Attendance and active participation are expected at all official SSP academic activities and functions. Any absence from the SSP session requires the prior approval of the SSP Director, with the concurrence of the participant's Department or TP Chair and the Academic Coordinator. Extended absences include: absence that prevents a participant from attending lectures, workshops, departmental activities, professional visits, TP activities, or other official SSP academic activities. Absence requests may be submitted via the process detailed in the SSP Absence Policy and Procedure document, which is located on the SSP website.

Academic Warning

Participants whose academic performance is unsatisfactory will be subject to one or more of the following procedures.

Core Examination

When a participant fails the core examination, the following procedure will be instituted:

1. The participant is notified of the failure in writing, from the Academic Coordinator.
2. The Academic Coordinator then consults with the participant's Department Chair and the SSP Director.
3. If it is determined by the Department Chair that the participant failed the examination due to extraneous circumstances, such as: poor language skills, personal difficulties, illness, or other extenuating circumstances, then a re-sit examination will be administered. If the participant passes the re-sit examination, then a Pass grade will be given. Marks on re-sit examinations will be limited to the maximum possible score of 50%. No re-sit examination will be arranged in case all participants pass the original exam. If the participant fails the re-sit examination, a grade of Unsatisfactory will be given for this evaluation element of the program.
4. If no extraneous circumstances for the failure are found, the participant will be informed by the Department Chair and in writing by the Academic Coordinator, that a grade of Unsatisfactory will be given for this evaluation element of the program.

Department

If a participant's academic performance is unsatisfactory in this program element as assessed by the Department Chair, then the participant will be placed on academic probation and will receive a written warning from the SSP Director detailing why the performance was considered unsatisfactory. The participant will have one week to improve performance. If the participant's performance does not improve to the satisfaction of the SSP Director, Academic Coordinator, and the participant's Department Chair, the participant will be notified of a grade of Unsatisfactory for this evaluation element of the program.

Team Project

If a participant's academic performance is unsatisfactory in this program element as assessed by the TP Chair, then the participant will be placed on academic probation and will receive a written warning from the SSP Director explaining the unsatisfactory performance. The participant will have one week to improve performance. If the participant's performance does not improve to the satisfaction of the SSP Director and the TP Chair, the participant will be notified of a grade of Unsatisfactory for this evaluation element of the program.

Action in case of Misconduct or Violation of the Code of Conduct and Ethics

ISU shall establish a centrally appointed Committee on Academic Conduct and Ethics (CACE) as specified in the procedures below. For the purposes of confidential and central record keeping, a one-page summary of the outcome of all investigations shall be copied to the ISU Academic Unit to be kept on file. Whenever possible and appropriate, informal resolution and mediation shall be used to resolve issues of individual behavior before resort is made to formal disciplinary procedures.

Committee on Academic Conduct and Ethics (CACE)

During a session of the SSP, the SSP Committee on Academic Conduct and Ethics addresses all issues regarding the disciplinary aspects of the academic life, academic freedom, academic duties, and responsibilities, as well as breaches to the ISU Code of Conduct and Ethics. In all matters brought before the SSP CACE, all parties will be given fair and equal opportunity to present their views to the Committee.

Membership

During a session of the SSP, the SSP CACE is composed of:

- For SSP, three Chairs elected from the Chairs present on site by the Chairs and the members of the faculty of ISU present on site; and
- The SSP Director.

This Committee elects its Chair from among the Chair members of the Committee.

Procedures

The SSP CACE will consider all allegations of ISU Code of Conduct and Ethics violations brought forth by a participant, staff member, or a member of the faculty. All such complaints must be made in writing. The SSP CACE, will provide a copy of the written complaint to the individual against whom the complaint has been made as soon as feasible. The individual against whom a complaint is lodged shall have the right to file a written response to the allegations or appear in person before the committee. The complainant must be willing to appear before the SSP CACE, should the Committee consider such an appearance necessary to determine the truth or substance of the allegations in the complaint.

The Committee shall investigate the complaints and determine if the allegations are valid and if they violate the ISU Code of Conduct and Ethics. If it is determined that a violation of the ISU Code of Conducts and Ethics has taken place, the SSP CACE will take one of the following disciplinary measures for violation of the Code of Conduct and Ethics: warning, probation, or dismissal.

The following measures or combinations of them may be imposed upon individuals found to have committed an offense under the ISU Code of Conduct and Ethics.

Warning and Probation

A written warning or notice of probation explicitly states that further disciplinary action will ensue if the individual fails to achieve a satisfactory level of behavior within the prescribed probation period. During the time of this warning or probation period the individual's behavior shall be closely monitored in an effort to affect improvement or change. If new significant problems of behavior arise during the probationary period, immediate dismissal may occur.

Dismissal for Cause

If a participant, member of the Faculty of ISU, Lecturer on site, or staff member has committed an offense under the ISU Code of Conduct and Ethics, and 1) does not achieve the required behavior standards by the review date provided in a written warning, or 2) if this individual is found to have engaged in willful misconduct, disobedience, or willful neglect of duty, a sanction of suspension from an ISU program for a specified period of time OR recommendation for expulsion can be imposed. A letter of suspension or a letter of termination will be issued to be effective on the date of the decision.

In the case of a participant, this sanction would directly affect a participant's registration in a program and may be imposed only where it has been determined that the offense committed is of such a serious nature that the participant's continued registration threatens the academic function of the ISU program or the ability of other participants to continue their program(s) of study.

In all cases of disciplinary action recommended by the SSP CACE, the individual involved has the right of an appeal to the ISU President.

Interim Conditions and Measures

Ongoing personal Safety

In cases where the allegations of behavior are serious and constitute a significant personal safety threat to members of the ISU community, the SSP Director is authorized to impose interim conditions that balance the need of complainants for safety with the requirement of fairness to the respondent. The interim conditions are in no way to be construed as indicative of guilt, and shall remain in place until the charges are disposed of under the SSP CACE's procedures.

Urgent Situations

In some circumstances, such as those involving serious threats or violent behavior, it may be necessary to remove the individual from ISU. The SSP Director may suspend the individual temporarily for up to three working days if there is reasonable apprehension that the safety of others is endangered, damage to property is likely to occur, or the continued presence of the individual would be disruptive to the legitimate operations of the ISU program. The individual(s) shall be informed immediately in writing of the reasons for the suspension and shall be afforded the opportunity to respond. The SSP CACE must review the temporary suspension period, following a preliminary investigation, and either revoke or continue the suspension. The individual has the right of appeal to the President.

Appeal Procedure

All members of the ISU community have the right of appeal against a decision regarding them. Appeals shall be submitted in writing to the President of ISU with the appropriate justifications. The President will evaluate the position of the complainant and the Chair of the CACE. The President has discretion to request additional information and consult with others. The President's decision is final.

ISU Code of Conduct and Ethics (COCE)

ISU's Code of Conduct and Ethics (COCE) commits everyone in the ISU community to the highest ethical standards in furtherance of ISU's mission of teaching, research, and service. The foundations of ethical behavior at ISU are a commitment to respecting the rights and dignity of all persons and a commitment to discharging our obligations to others in a fair and honest manner. Every member of ISU plays an important role in keeping these commitments by demonstrating integrity and respect in their daily activities and in the performance of their responsibilities. This Code of Conduct and Ethics establishes a statement of principles to guide the activities of all ISU faculty, staff, and participants.

Code of Honorable Conduct

All ISU participants, staff, and faculty shall conduct themselves in a manner that is honorable and respectful of other people and of ISU. They shall abstain from any public action, statement, or publication that would be incompatible with their duties or obligations as an ISU staff member and/or faculty members. This shall pertain to activities within classes, during examinations, while participating in ISU-sponsored events, and within the host communities.

Policy on Harassment and Discriminatory Behavior

Discrimination against, or harassment of, an individual on the basis of race, origin, nationality, gender, sexual orientation, religion, physical challenge, or any other ground is prohibited and shall not be tolerated.

Academic Honesty

All members of the ISU community shall conduct themselves in accordance with accepted principles of academic honesty as described in this Program Handbook. Cheating, plagiarism, copyright violations, or other forms of dishonesty are prohibited and shall not be tolerated. Violation of the ISU academic honesty policy will result in penalties commensurate with the offense.

Offenses

ISU considers the following behavior, or attempts thereof, by any participant, staff, or faculty member, whether acting alone or with any other persons, to violate the ISU Code of Conduct and Ethics, including, but not limited to:

(a) Physical harm or threat of physical harm to any person or persons, including, but not limited to assault, sexual

abuse, or other forms of physical abuse.

(b) Harassment, whether physical or verbal, oral or written, which is beyond the bounds of protected free speech, directed at a specific individual(s) and likely to cause an immediate breach of the peace.

(c) Conduct which threatens the mental health, physical health, or safety of any person or persons including, but not limited to drug or alcohol abuse, and other forms of destructive behavior.

(d) Academic dishonesty, including, but not limited to plagiarism and cheating, and other forms of academic misconduct, for example, misuse of academic resources or facilities, or misuse of computer software, data, equipment, or networks.

(e) Intentional disruption or obstruction of any activity organized by ISU or by an institution hosting an ISU program or activity, such as the SSP, or the right of its members to carry on their legitimate activities, to speak or to associate with others (including their exercise of the right to assemble and to peaceful protest).

(f) Theft of or damage to personal or ISU property, effects, information, intellectual property, or services, or illegal possession or use of the same.

(g) Forgery, alteration, fabrication, or misuse of identification cards, records, grades, documents, or misrepresentation of any kind to an ISU office or member.

(h) Unauthorized entry, use, or occupation of ISU facilities or SSP host facilities that are locked, closed, or otherwise restricted as to use.

(i) Disorderly conduct including, but not limited to public intoxication, lewd, indecent or obscene behavior, libel, slander, and illegal gambling.

(j) Unauthorized possession or use of any weapon including firearms, BB-guns, air rifles, explosive devices, fireworks, or any other dangerous, illegal, or hazardous object or material, and improper use as a weapon of any otherwise permitted object or material.

(k) Counselling, procuring, conspiring, or aiding a person with commission of an offense, or knowingly or maliciously bringing a false charge against any member of ISU under this code.

(l) Refusal to comply with a sanction or sanctions imposed under the procedures of this code.

Duty to Assist in Implementing the ISU Code of Conduct and Ethics

Participants, staff, and faculty who witness violations of the ISU Code of Conduct and Ethics are encouraged to approach the offender in a manner that can lead to informal mitigation of the offense. Every attempt should be made to resolve the situation in a manner that assists the offender to correct the behavior while maintaining the integrity of ISU and other individuals who may be involved. In instances where the offense is considered to merit additional action, the matter is to be referred to the appropriate person: Where a participant is involved in such offense, the appropriate person is the Director of the relevant ISU Program; where it is a member of the ISU Faculty, it is the Dean; in other cases, it is the ISU President.

Curriculum

Core Lecture Series (update to printed version of Program Handbook)

Week 1

Jul-13	L01	Core Lecture Series Overview	Tan/Welch
	L02	Origins of the Space Age	Hoffman
	L03	Legal Foundations of International Space Activities	Shahar
	L04	The Context of Commercial Space	Sallaberger
Jul-14	L05	The Space Environment	Hoffman
	L06	Orbital Mechanics	Welch
	L07	Policy Rationales for Space Activities	Logsdon
	L08	Business Planning and Management of Space Projects	Sallaberger
Jul-15	L09	Orbits and Applications	Welch
	L10	Introduction to Space Applications	Tan
	L11	Economic Rationales and Costing of Space Programs	Peeters
	L12	From Competition to Cooperation in Space	Logsdon

Week 2

Jul-17	L13	The Sun and Space Weather	Welch
	L14	Microgravity	Hoffman
	L15	Financial Issues and Techniques of Space Projects	Peeters
	L16	Introduction to Space Humanities	Dougherty
Jul-18	L17	Marketing, Technology Transfer and Controls	Peeters
	L18	International Space Station Research	Hoffman
	L19	What Has Space Brought Us?	Meir
	L20	Space Propulsion and Launch Vehicles	Welch
Jul-19	L21	International Space Business	Peeters
	L22	Cultural Rationales for Space Activities	Dougherty
	L23	Introduction to Remote Sensing and the Electromagnetic Spectrum	Tan
	L24	Digital Image Processing	Tan
Jul-20	L25	Life Cycle of Stars	Welch
	L26	Space Systems Engineering and Mission Design	Connolly
	L27	Introduction to Human Performance in Space	Tranfield
	L28	Space Art and Culture	Dougherty
Jul-21	L29	Human Adaptation and Countermeasures	Tranfield
	L30	Space Habitability Design	Connolly
	L31	Current and Future Space Remote Sensing	Tan
	L32	Space Futures	Dougherty

Week 3

Jul-24	Midterm Quiz		
	L33	Becoming a Space Entrepreneur	Stott
	L34	Spacecraft Subsystems 1	Welch
	L35	Space Physiology and Medicine 1	Damann
Jul-25	L36	Space Based Positioning, Navigation and Timing	Tan
	L37	Space Robotics	Choi
	L38	Space Physiology and Medicine 2	Damann
	L39	Astrobiology	Abramovich
Jul-26	L40	Current and Future Trends in Global Navigation Satellite Systems	Tan
	L41	Spacecraft Subsystems 2	Choi
	L42	Space Situational Awareness and Space Debris Mitigation	Jehn
	L43	Environmental Control and Life Systems	Damann
Jul-27	L44	The Solar System, Moon and Mars	Marov
	L45	Space, Society, Communications and Outreach	de Dalmau
	L46	New Space: The Emerging Commercial Space Industry	Martin
	L47	Exoplanets and New Developments	Marov
Jul-28	L48	Space and Earth	Tan
	L49	National Implementation of Space Law	Johnson-Freese
	L50	Space Operations	Nelson
	L51	Design Thinking and New Business Models	Martin

Week 4

Jul-31	L52	Satellite Telecommunications	Glover
	L53	Geopolitics and Major Space Powers	Johnson-Freese
	L54	Space Psychology	Hamilton
	L55	New and Emerging Space Players	Johnson-Freese
Aug-01	L56	Commercial Satellite Communications Industry	Glover
	L57	Medicine in Space	Hamilton
	L58	Cosmology: Origin and Fate of the Universe	Marov
	L59	Core Lecture Series Wrap-Up	Tan/Welch
Aug-02	Core Lecture Exam		

Core Lecture Chairs

Dr. Su-Yin Tan
Canada/Papua New Guinea
University of Waterloo

Prof. Chris Welch
UK
International Space University

Space Applications Department (APP)

Access to space can provide practical and valuable benefits to all humankind. The Space Applications Department examines the various applications on Earth that are offered by space technologies with a primary focus on Earth-orbiting satellite systems, ground systems, and end-user equipment hardware and software. Key areas of focus include:

- Satellite communication systems and services
- Remote sensing and Earth observation
- Geographic information systems (GIS)
- Satellite navigation systems

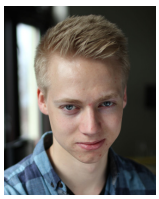
The Department explores enabling space technologies and their scientific benefits and societal applications. Themes range from telecommunication fundamentals to remote sensing image processing/interpretation, global navigation satellite systems (GNSS), and GIS data management. Workshops and demonstrations provide hands-on training with hardware and software for satellite payload development, image processing (optical, radar), global positioning systems (GPS), and data analysis. Professional visits to local facilities provide further insight into civilian and commercial space applications, such as desert and oceanography research, defense applications, and imagery intelligence.

Participants will be able to

- Engage in a variety of workshops, demonstrations, and professional visits that explore enabling space technologies and their applications.
- Develop proficiency in technological hardware and software for image processing, telecommunications, GIS, and GPS.
- Design and complete a research project emphasizing the application of space technologies and present results in oral and written formats.
- Participate in group activities in an interdisciplinary and intercultural environment.

Department Chair

Dr. Su-Yin Tan
Canada / Papua New Guinea



Teaching Associate

Petter Skanke
Norway

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: DEPARTMENT INTRODUCTION/GIS AND MARS EXPLORATION WORKSHOP** Department overview of requirements, evaluation and expected deliverables, including the "ISU SpaceApps Challenge". Followed by a hands-on computing workshop using Geographic Information Systems (GIS) for landing site selection for the Mars Exploration Rovers. Local satellite imagery will also be explored.	Su-Yin Tan Petter Skanke Dan Glover
Aug-2	**DA2: ISRAEL OCEANOGRAPHIC AND LIMNOLOGIC RESEARCH INSTITUTE VISIT** Visit to the Israel Oceanographic and Limnological Research (IOLR) oceanographic facilities in Haifa to learn about experiments for maritime research. IOLR is a national research institution (non-profit governmental corporation) established in 1967 with the mission of generating knowledge for sustainable use and protection of Israel's marine, coastal and freshwater resources. IOLR conducts scientific research in the fields of oceanography, limnology, mariculture, and marine biotechnology. IOLR maintains advanced research facilities including research vessels and survey craft operating on the Meditarranean and Lake Kinneret. (Joint activity with SCI)	Reut Abramovich Su-Yin Tan Rene Laufer Petter Skanke Dan Cohen Dan Glover
Aug-3	**DA3: FUTURE TRENDS IN SPACE TELECOMMUNICATIONS & TECHNOLOGY WORKSHOP** A Delphi Survey will be used to project future trends in space telecommunication services and space technology. Learn how to apply the Delphi technique, which is a widely used and accepted method for gathering data from respondents within their domain of expertise and for consensus-building. It is designed as a group communication process which is aimed at achieving convergence of opinion on a specific real-world issue and has been used in various fields. Participants will work in groups to develop consensus projections or forecasts based on directed rounds of opinion collection and feedback.	Dan Glover
Aug-4	**DA4: ISRAEL AEROSPACE INDUSTRY PROFESSIONAL VISIT - IAI MBT SPACE DIVISION** Full day of professional visits to learn about the Israeli space industry and space applications. Morning visit to IAI's MBT Space Division, which is the prime contractor for all Israeli space programs and the largest satellite manufacturer in Israel. Guided tour of the show room, integration facility, and AMOS communication satellite control center to understand processes involved in satellite development up to full satellite integration, testing, and operation. (Joint activity with MGB)	Danielle Potchter Su-Yin Tan Adil Jafry Petter Skanke Allyson Reneau

Aug-4	**DA5: ADVANCED SATELLITE COMMUNICATION SOLUTIONS & SATELLITE OPTICS** Afternoon visit to Gilat Satellite Networks Ltd., which is a leading provider of end-to-end satellite-based broadband communication solutions. It develops and sells VSAT satellite ground stations and related equipment. Gilat primarily focuses on consumer broadband, enterprise, cellular, and mobility applications for the commercial, public safety, and the defense sectors. Finally, a visit to Elbit Elop will demonstrate the development and production of complex space borne electro-optic observation systems. Learn about space telescopes and space cameras for military, government, and civilian space applications. (Joint activity with MGB continued)	Avi Gal Ilan Porat Su-Yin Tan Petter Skanke
Aug-7	**DA6: ASHER SPACE RESEARCH INSTITUTE (ASRI) WORKSHOP** ASRI is a leading space research center at Technion - Israel Institute of Technology dedicated to the development of space systems based on advanced and innovative technologies. Specialized laboratories include the Distributed Space Systems Laboratory (DSSL), Electric Propulsion, Laboratory for Space Interferometry (LaSI), and the Space Optics Laboratory. Hands-on activity to learn about the dynamics and control of multiple formation-flying satellites, utilizing experimental facilities including an air-bearing table, satellite models, and sensing devices.	Pini Gurfil Daniel Brack Eviatar Edlerman
Aug-8	**DA7: IMAGERY INTELLIGENCE FROM SPACE WORKSHOP** Satellites are the ultimate spy - they can observe areas in order to get information while remaining virtually undetected. This workshop, given by an image analyst and satellite operator, will give a sneak peek into imagery intelligence (IMINT) from space from both points of view; illustrating the applications of space based remote sensing while discussing the capabilities and trade-offs in remote sensing technology.	Joe Cotti Danielle Potchter
Aug-9	**DA8: UNMANNED AERIAL SYSTEMS AND AVIATION APPLICATIONS - ISRAEL AEROSPACE INDUSTRIES LTD.** UAVs have numerous military and special operation applications with growing civilian uses. Israel pioneered the modern use of UAVs and remains a leader in UAV technologies. IAI Ltd. is Israel's largest aerospace and defense company, specializing in developing and manufacturing advanced, state-of-the-art systems for air, space, sea, land, cyber and homeland security. Visit the IAI central campus and learn about the maintenance, upgrade, and manufacture of UAVs and other aircraft. We will also visit the IAI Commercial Aircraft Group and BEDEK Aviation.	Danielle Potcher Daniel Brack Su-Yin Tan Petter Skanke
Aug-10	**DA9: GROUND TRUTH FIELD TRIP - BGU INSTITUTES FOR DESERT RESEARCH VISIT** The Jacob Blaustein Institutes for Desert Research is part of the Ben-Gurion University and located in the centre of the Negev Desert. Due to its unique location, the site is used for calibration and validation of satellite data. During this full day activity hosted by the Earth and Planetary Image Facility, we will investigate how remote sensing techniques can be connected with ground truth findings. Learn about interdisciplinary research using space-based technologies and SAR images for studying the desert climate with a ground penetrating radar demonstration. An afternoon tour of Makhtesh Gadol (The Big Crater) in the Negev mountain area before departure for Mitzpe Ramon.	Dan Blumberg Shimrit Maman Daniel Brack Su-Yin Tan Petter Skanke
Aug-10	**DA10: WISE OBSERVATORY VISIT - EARTH AND PLANETARY IMAGERY** The Florence and George Wise Observatory is an astronomical observatory owned and operated by Tel-Aviv University. The only professional astronomical observatory in Israel, it is located 5 km west of the city of Mitzpe Ramon in the Negev Desert near the edge of the Ramon Crater. Learn about the interdisciplinary fields of astronomy, astrophysics, space applications, and remote sensing. Night-time observation activity with overnight stay in the Negev Desert. (Joint activity with ENG, HUM, and SCI)	Shai Kaspi Su-Yin Tan Petter Skanke
Aug-14	**DA11: ORBIT COMMUNICATION SYSTEMS AND SERVICES** Visit ORBIT Communication Systems Ltd., a leading global provider in business and mission-critical communication solutions and services for land, sea, air, and space applications. We will learn about the company's applications in areas of tracking and telemetry, Earth observation, and mobile satellite communication antenna systems. Live demonstrations of main product lines and a visit to the assembly and manufacturing floor and testing area on the roof.	Stav Gizunterman Su-Yin Tan Petter Skanke
Aug-15	**DA12: SPACE APPLICATIONS FOR DEFENSE SYSTEMS** 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 international customers. Israel's second largest defense company, it offers a diversified array of innovative solution and technologies, such as underwater systems through naval, ground, and air superiority systems to space systems. We will visit a new clean room, completed in 2010, which includes assembly, integration and testing (AIT) sections and propulsion modules production.	Su-Yin Tan Petter Skanke
Aug-16	**DA13: FINAL PROJECT PRESENTATIONS** Oral presentations of final projects and submission of a written report or digital conference-style poster as part of the departmental evaluation. ISU SpaceApps Challenge winners announced. Feedback will be provided by faculty, visiting lecturers, and fellow participants.	Su-Yin Tan Petter Skanke

Space Engineering Department (ENG)

The Space Engineering Department (ENG) allows participants to gain hands-on experience in all stages of the systems engineering process of space systems at multiple levels, from the simplest to the most complex. Building on the knowledge gained during the core lectures related to space engineering, emphasis is placed on understanding each level of system design, integration, and testing as complexity increases from components to subsystems, to spacecraft, to the space mission, and eventually to entire space programs.

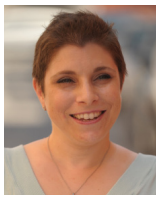
Throughout the department, participants will also have the opportunity to undertake major projects. The first project is the design, construction, testing, and launch of a model rocket to meet a set of flight requirements, including the safe retrieval of its payload. The second is the design a payload for a stratospheric high altitude balloon that will be launched during the SSP. The engineering payload will be a modified drone that will capture video of the Earth from an altitude of 30 km and return to the launch site. These projects will allow the participants an opportunity to implement all aspects of the system engineering process in the conception, design, integration, and operation of a simulated spacecraft.

At the end of the department time, the participants should be able to:

- Approach and analyze a problem with an engineering mindset
- Design, simulate, manufacture, integrate, test, and launch a model rocket - skills that can be extended to any other complex system
- Complete a preliminary design of a particular subsystem of a spacecraft, and predict how different design parameters affect other subsystems
- Present and defend a research project in front of a technical audience.

Department Chair

Joseph Pellegrino
USA



Department Associate Chair

Maya Glickman-Pariente
Israel

Teaching Associate

Cory Newman
Canada

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: DEPARTMENT INTRODUCTION** Participants are introduced to the roster of activities and guidelines of the department. The Stratospheric Balloon and Model Rocket activities will be introduced during the first deparmtent day. A lecture about space engineering will be provided as well.	Maya Glickman Joe Pellegrino John Connolly Cory Newman
Aug-2	**DA2: BALLOON MISSION I - INTRODUCTION AND FINAL DESIGN** This activity will allow the participants to learn about how to design and execute an experiment on a high altitude balloon. The payload will be attached to a stratospheric balloon (supported by a local expert company) and will fly up to about 30 km. Part of the payload will be a drone that will be programed to get back to the initial coordinates and will have a release mechanism so that it will detach from the balloon and come back. This DA will be an introduction to all parts of the mission, which is a collaboration with SCI, APP and HUM departments, as well as allocating assignments for each participant to be completed by the end of the session.	Maya Glickman Joe Pellegrino Cory Newman
Aug-3	**DA3: ROBOTIC PLANETARY EXPLORATION ANALOGUE MISSION - ROVER SYSTEMS** Participants will be introduced to the importance of rover design in the success of surface exploration missions and the relationship between mission concepts and rover performance requirements. An overview of rover subsystems critical to meeting these requirements and a summary of the state-of-the-art in power, communication, control, navigation and localization, environmental protection and locomotion system designs will be provided. Examples of existing flight and terrestrial analog rovers illustrate the relationship between rover functionality and design and future requirements for planetary surface exploration will be discussed with a special emphasis on pre-cursor in-situ resource utilization missions. Design methodologies and analysis tools useful for developing conceptual rover designs will be introduced. Participants will be divided into teams where they will conduct a conceptual design of a rover to accomplish a specific mission. Provided with a mission concept they will have to work towards defining the	Ewan Reid Peter Visscher Melissa Battler Michaela Musilova

	performance requirements of the rover, develop multiple rover concepts and conduct a trade- off analysis to select the optimal rover configuration using analysis tools provided to the teams in order to refine the conceptual design.	
Aug-4	**DA4: MODEL ROCKET DESIGN AND CONSTRUCTION WORKSHOP 1** Participants will be divided into teams of four to design and construct a model rocket that must meet a set of performance requirements. This workshop is dedicated to the design of each team's rocket, and passing a design review so that construction can begin. Computer simulations (RockSim, Open Rocket) are used to choose geometric properties, mass properties and engines to meet altitude, flight time, payload and mass constraints. Participant teams must design their rockets based on materials available in the workshop and must construct them with available tools.	Maya Glickman Joe Pellegrino Cory Newman John Connolly Thomas Goodman
Aug-4	**DA5: ROBOTIC PLANETARY EXPLORATION ANALOGUE MISSION - MISSION PLANNING** Leveraging the knowledge from the preliminary workshop to prepare for mission simulation the participants will be provided with an outline of the process that government agencies and private companies undertake when developing mission architectures and an explanation of the specific objectives and rules for the mission simulation. Divided into mixed teams made of ENG and SCI department participants will be required to develop mission objectives (science or ISRU related) and mission requirements as well as defining the operations concept for the mission using available mobility and vision/sensor systems and generate procedures for real- time operations.	Ewan Reid Peter Visscher Melissa Battler Michaela Musilova
Aug-7	**DA6: BALLOON MISSION II - TESTING** Participants will try to communicate with the ground station which will be built by the SCI department and test the link remotely to make sure we will have a good connection in the air to get the products.	Maya Glickman Joe Pellegrino Cory Newman
Aug-8	**DA7: ROBOTIC PLANETARY EXPLORATION ANALOGUE MISSION - MISSION SIMULATION / STK WORKSHOP (SEE DA8 FOR DESCRIPTION)** Taking place at both the SSP site and the analogue site in North America where the Small Planetary Rover Prototype (SPRP) - developed by Ontario Drive and Gear (ODG) - will be deployed, each team will execute their mission plan in order to meet their mission objectives. Participants will control the rovers at the analogue terrain via remote tele-operation from the control center on campus in Haifa. They will have to work as a real operations support team using radios/voice loop communications and potentially communications delays or limited bandwidth. Each team will have a fixed time available in which to achieve mission objectives with additional points being awarded for saving time, energy, bandwidth, etc.	Ewan Reid Peter Visscher Melissa Battler Michaela Musilova
Aug-9	**DA8: ADVANCED STK WORKSHOP / RPEAM - MISSION SIMULATION (SEE DA7)** The participants will learn how to simulate satellite and space missions using STK (Systems Tool Kit) advanced tool.	Maya Glickman Vera Gutman
Aug-10	**DA9: BALLOON MISSION III - LAUNCH** The participants will launch the stratospheric balloon together with the local experts (MER company) with the payload attached and try to communicate with the onboard transceiver and locate the drone as it comes back.	Maya Glickman Joe Pellegrino Cory Newman
Aug-10	**DA10: BALLOON MISSION IV - POST-FLIGHT ANALYSIS** Participants will analyze the data received and the retrieved payload and conclude the experiment.	Maya Glickman Joe Pellegrino Cory Newman
Aug-14	**DA11: MODEL ROCKET DESIGN AND CONSTRUCTION WORKSHOP 2** Upon approval of the designs completed in Rocket Workshop I, participant teams begin construction of their rockets using available parts and tools. If teams do not complete construction of their rockets during this period, additional time will be made available in mornings/evenings prior to the launch. The construction phase concludes with each rocket passing stability and safety checks, and being approved for launch. Launch day procedures will be reviewed and safety procedures discussed.	Maya Glickman Joe Pellegrino Cory Newman John Connolly Thomas Goodman
Aug-15	**DA12: MBT VISIT** Participants will visit the biggest space company today in isarel, and see the ground station and other facilities.	Maya Glickman Joe Pellegrino Cory Newman
Aug-16	**DA13: FINAL PRESENTATIONS**	ENG Participants

Human Performance in Space Department (HPS)

The Human Performance in Space Department examines the biological, physiological, psychological, and medical issues that are unique to human spaceflight, as well as the challenges these issues may present to mission success. Departmental hands-on activities will enable participants to evaluate the challenges of providing medical support during space missions.

Participants will examine issues related to both short- and long-duration/long-distance human space missions, including:

- Countermeasures to prevent de-conditioning of organ systems, including artificial gravity
- Constraints of space operational medicine
- Issues for psychological adaptation to confinement and isolation
- Life support systems

Learning Outcomes:

- Engage in various workshops, panels, professional visits, and simulations to gain knowledge and understanding of concepts related to human performance in space
- Practice the training requirements and duties of the Crew Medical Officer
- Review actual cases of medical issues that past crews have faced during human spaceflight
- Gain practical training and experience with interplanetary mission success
- Design and conduct an individual or group project with a focus on human performance in space, and present findings to an international panel of experts
- Participate in group activities in an interdisciplinary and intercultural environment

Department Chair

Dr. Kris Lehnhardt
USA/Canada

Teaching Associate

Irina Thaler
Austria

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: DEPARTMENTAL INTRODUCTION/HPS RESEARCH PROJECT PLANNING** Participants will be oriented with the department activities, visiting lecturers, research project, and each other. We will review the research method and hypothesis generation/testing. Then, we will outline options, examples, and suggestions for individual or small team projects and provide real-time planning assistance.	Kris Lehnhardt Jon Clark Irina Thaler Ana Diaz (Webex)
Aug-2	**DA2: OPERATIONAL AEROSPACE MEDICINE** The entire process of designing and executing the RedBull Stratos and StratEx high altitude jumps will be covered (monitoring, contingency planning, developing hardware, etc)	Jon Clark Kris Lehnhardt Irina Thaler
Aug-3	**DA3: YOU'RE THE FLIGHT SURGEON** We will partake in a participatory discussion of the real-life practice of medicine in space, including the training requirements and duties of the Crew Medical Officer and a review of actual and theoretical cases of medical issues that past crews have faced during human spaceflight.	Kris Lehnhardt Jon Clark Irina Thaler
Aug-4	**DA4: REGULATION OF HOMEOSTASIS IN RELATION TO SPACE OPERATIONAL MEDICINE** This activity will familiarize participants with the regulation of blood pressure and cardiovascular function on Earth and how physiology changes on orbit. Participants will participate in hands-on laboratory experience manually monitoring changes in heart rate and blood pressure. Additionally, abattoir mammalian (bovine) hearts will be used to examine cardiac anatomy.	Heather Allaway Zaid Abassi Kris Lehnhardt Irina Thaler

Aug-4	**DA5: SIMULATION OF INTERPLANETARY OPERATIONS: BRIEFING AND PLANNING PART 1** Participants will gain practical experience with issues that may arise during operations of a planetary surface located beyond the limits of real-time communication with mission control. Challenges include successful deployment and operation of surface rover and drone, collection of scientific and biometric data, and teamwork under pressure. A Mars500 crew member will lead this simulated analogue mission.	Diego Urbina Heather Allaway Kris Lehnhardt Irina Thaler
Aug-7	**DA6: SIMULATION OF INTERPLANETARY OPERATIONS: MISSION PART 2** Participants will gain practical experience with issues that may arise during operations of a planetary surface located beyond the limits of real-time communication with mission control. Challenges include successful deployment and operation of surface rover and drone, collection of scientific and biometric data, and teamwork under pressure. A Mars500 crew member will lead this simulated analogue mission.	Diego Urbina Heather Allaway Kris Lehnhardt Irina Thaler
Aug-8	**DA7: HPS RESEARCH PROJECT WORK SESSION** Opportunity for individuals or groups to work on their research project, getting assistance from any onsite experts that are able to participate.	Kris Lehnhardt Diego Urbina Heather Allaway Irina Thaler
Aug-9	**DA8: MUSCULOSKELETAL ADAPTIONS TO SPACEFLIGHT AND COUNTERMEASURES** This activity will teach participants about the physiologic changes associated with musculoskeletal disuse atrophy in astronauts during long duration missions. Participants will evaluate the methods (exercise testing and bone health measures) used to test the efficacy of current countermeasures and then will be given the opportunity to volunteer for an exercise performance test. The physiologic data collected will be discussed/ analyzed following testing.	Heather Allaway Zaid Abassi Kris Lehnhardt Irina Thaler
Aug-10	**DA9: RAMBAM HOSPITAL HYPERBARIC CHAMBER VISIT** Learn about pressure-related illnesses and injuries in spaceflight - barotrauma, decompression illness, ebullism.	Zaid Abassi Kris Lehnhardt Irina Thaler Jeff Jones
Aug-10	**DA10: MEDICAL CARE IN SPACE** Hands-on experience providing basic medical skills. Many of these skills are incorporated into the training of Crew Medical Officers for human spaceflight. This may include CPR, splinting, IVs, suturing, airways, measuring vital signs, and spinal immobilization.	Zaid Abassi Kris Lehnhardt Jeff Jones Irina Thaler
Aug-14	**DA11: HPS RESEARCH PROJECT PRESENTATIONS PART 1** Participants will present their work as individuals or teams to a panel of experts and their departmental colleagues.	Kris Lehnhardt Jeff Jones Irina Thaler
Aug-15	**DA12: HPS RESEARCH PROJECT PRESENTATIONS PART 2** Participants will present their work as individuals or teams to a panel of experts and their departmental colleagues.	Kris Lehnhardt Jeff Jones Irina Thaler
Aug-16	**DA13: ROBOTICS IN MEDICINE AND SPACE** Participants will visit a local hospital and learn about medical robotics and space applications.	Zaid Abassi Jeff Jones Kris Lehnhardt Irina Thaler

Space Humanities Department (HUM)

The Space Humanities Department focuses on the interplay between human culture and our space aspirations and endeavors. To explore this interplay we will undertake a series of highly engaging, in-depth and interactive activities led by cultural pioneers from the space community.

Upon joining the department you will be able to create a space focused movie; carry out a social media campaign for a Mars analogue mission; engage with local youth through an outreach event, test your skills as an interviewer and learn best practices in media relations.

Our activities are specifically designed to take you on a journey of inspiration, creation and reflection. You will have the opportunity to work outside your familiar realm of experience, to explore the basic motivations for space exploration. Through interactive discussions and workshops, we will gain an understanding of the role of culture in affecting the next generation of space doers and dreamers.

Participants will:

- Participate in an outdoor adventure to the Makhtesh Ramon to explore the Overview Effect;
- Create a social media campaign to contribute to the SCI/ENG Robotic Planetary Exploration Analogue Mission;
- Create a 3-minute space focused movie to promote space and inspire society, to be shown in the Heller Cinema;
- Learn how to use communications and media relations effectively, regarding our present and future space endeavors;
- Explore and discuss future space societies and governance on Mars;
- Understand the power and place of space for outreach;

Understanding cultural rationales is critical to our future in space. The Space Humanities Department is designed to inspire and allow participants to explore, create and reflect in a motivational and supportive environment.

Department Co-Chair

Dr. Norah Patten
Ireland

Department Co-Chair

Dr. Geoff Steeves
Canada

Teaching Associate

Yevgeny Tsodikovich
Israel

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: STRAIGHT TALKING SSP** Participants will develop improvisation techniques and theatre skills to engage and excite any audience. They will develop a versatile presentation structure for future public speaking events. We will discover fun and freedom in expression with a theatrical twist.	Niamh Shaw Geoff Steeves Norah Patten
Aug-2	**DA2: SPACE FILM AND MOVIE MAKING** Participants will be given an introduction to the movie making personal project. Throughout the department phase, participants will create their own three-minute space focused movies and on the final DA these movies will be screened at the Heller Cinema. In this DA, the tools for making the movie will be discussed; feedback and lessons learned from previous projects will be shared; and an overview of the movie planning process will be explored.	Niamh Shaw
Aug-3	**DA3: CRAFTING A COMPELLING STORY** To develop a strong foundation for the movie projects, this DA will outline the fundamental principles of storytelling, story structure, including the Hero's journey, emerging methods of communicating STEM to the public, samples of great storytelling, and insights from movie directors and other experienced communicators of STEM.	Niamh Shaw John Beck-Hofmann Michael Potter
Aug-4	**DA4: SOCIAL MEDIA** Social media techniques will be explored and participants will learn to put their knowledge into practice. Participants will gain an understanding of what makes a social media campaign successful and how to create viral media content. Participants will create a social media campaign to promote the SSP16 Robotic Analogue Mission. They will learn from leaders in the field and transform this complicated mission into an exciting social media event.	Ruth McAvinia Tracy King

Aug-4	**DA5: SPACE OUTREACH AND ART** We will practice the art of engaging an audience through demonstrations that call for volunteers and active participation of all attendants. Juan de Dalmau, head of the ESTEC & ECSAT Communication Office at European Space Agency, will lead participants in activities to understand the objectives pursued by the organizations embarked in space outreach, their target audiences, messages and the media and techniques used. We will hear from the executive director of the SciArt Exchange / director of the Humans in Space Art Program, Jancy McPhee.	Juan de Dalmau Jancy McPhee
Aug-7	**DA6: INCENTIVE BASED PRIZES - THE XPRIZE AND SPACEIL** How has space become a major player in the evolution of incentive based prizes and how have these prizes captivated the world? What is it about space that grabs the attention of the global community? In this DA, we will learn about the inspiration behind incentive based prizes and how the XPRIZE has captivated imaginations from around the world. We will discuss the Google Lunar XPRIZE (GLXP) and the Ansari XPRIZE as case studies and then participate in an "XPRIZE Visioneering" for future space prizes. We will speak with GLXP participant SpaceIL about their involvement in the competition and learn how they have reached over 150,000 children through its STEM activities.	Nathan Wong Yonathan Winetraub Ayelet Weizman
Aug-8	**DA7: MARS TREATYMAKING** Participants from the PEL and HUM departments will participate in a mock COPUOS simulation of the negotiation for a new international treaty for the human settlement of Mars, set 10 years in the future. HUM participants will run a premortem, a form of project planning workshop based on why a project will fail and advise the negotiations on how to make a more robust treaty.	Ruth McAvina Chris Johnson Andrea Harrington
Aug-9	**DA8: SOUNDS OF SPACE** We take sounds from space by converting radio and gravitational waves to sound waves, and we have brought our own sounds and music to space on robotic and crewed spacecraft. This interactive session will look at how music and sound create meaning, and how they have been used in a space context by individuals and space agencies to change perceptions and open up the imagination. Then we will develop the soundtracks for your personal movie projects.	Oshri Rozenheck Ruth McAvina
Aug-10	**DA9: OVERVIEW EFFECT AT THE MAKHTESH RAMON** The department will travel to the Makhtesh Ramon where we will be given an introduction to the "Overview Effect" by explorer and pioneer Loretta Whitesides. We will then work to develop strategies for communicating the "Overview" experience with the greater public to further our social evolution. A review of attempts to achieve this from Arthur C Clarke to Carl Sagan to Frank White will be included.	Loretta Whitesides
Aug-10	**DA10: WISE OBSERVATORY (MAKHTESH RAMON)** Tel Aviv university's Wise observatory is located on one of the mountains surrounding the crater and we will visit the observatory and see the telescopes on site and learn about the science that can be achieved. The evening will be used for astrophotography and astronomy.	Shai Kaspi Yevgeny Tsodikovich
Aug-14	**DA11: THE EFFECT OF GENDER ON TEAM DYNAMICS** Participants will be part of a team dynamics experiment. They will be divided into teams and perform missions while demonstrating the effect of gender on team dynamics. We will discuss and analyze the experiment, as well as, real-life situations involving engineers, managers, professors, astronauts and more while emphasizing the need for gender variety, especially in the space sector. We will gain additional insights from retired astronaut Nicole Stott.	Danielle Potchter Michal Jashinski Vera Gutman Nicole Stott
Aug-15	**DA12: MEDIA TRAINING** The objective of this activity is to introduce participants to space science communication and experience in communicating through mainstream media channels. We will learn and practice how to present scientific ideas and activities from the space sectors in a more accessible way, to the general public. Participants will travel to the Haifa University TV studio where they will be introduced to best practices in tv and radio interview techniques. Participants will take part in mock tv interviews and their performance will be analyzed by the group.	Ayelet Baram-Tsabari Yael Barel
Aug-16	**DA13: MOVIE SCREENING** Participants will present on the development of their movie projects followed by a screening of their movies. They will have the opportinuty to give a 'behind the sceens' perspective on their movies and explain how they transformed their space topic into a 3 minute production for the promotion of space. Participants will be able to discuss their project and gather feedback from a panel of experts.	Norah Patten Geoff Steeves

Space Management and Business Department (MGB)

Space industry, driven by commercial initiatives, is undergoing a renaissance, showing innovation that is now impacting other industrial sectors such as agriculture, marine transportation, energy, and logistics. Commercial Off-the-shelf (COTS) technologies and innovations in modular launch combined with 3D printing and nano-materials have caught the imagination of entrepreneurs and venture capitalists alike. It is expected that future space concepts are going to be more promising, ambitious, and will likely incorporate advances in robotics, optics, propulsion, and communication, enabling entirely new types of economic activities on ground and in-orbit.

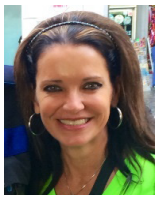
Succeeding in this future environment would require space industry professionals to not only be proficient in space technologies, but also understand and articulate a vision that will attract resources for their organization's growth. SSP'16 participants will be introduced to finance and deal structure negotiations process and methodologies by experienced deal-makers (both venture capitalists and entrepreneurs). They will further interact with captains of space industry who are helping redefine the policy on commercial space initiatives. Finally, the participants will get a chance to interact with seasoned executives who have a history of building successful businesses in space, and discuss with them the best practices in leadership, resource and stakeholder management, and what inspired them to start their own business.

Learning outcomes for Management and Business Department are:

- An understanding of key commercial trends
- Appreciation for different cultures and norms, players, motivations, and their 'calling card'
- Skills/deeper understanding of: leadership, ethics/integrity, professional network building, capital raising, finance, policy,
- Executing and monetizing new ideas, market definition, market development, product design/development, legal structures, governance, commercial risks management.

Department Chair

Adil Jafry
USA



Teaching Associate

Allyson Reneau
USA

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: DEPARTMENT INTRODUCTION** Corporate and organizational leadership requires a deep understanding of the industry in which one is operating as well as management norms and practices. This session will discuss modern management theory and practices in the space industry, including the value of corporate culture and institutional memory. Participants will also be introduced to best practices in governance, particulalry in startup initiatives and organizations.	Daniel Rockberger Chris Stott Adil Jafry Allyson Reneau
Aug-2	**DA2: FINANCING COMMERCIAL SATELLITES** Space business is a capital intensive business, and financing it with appropriate equity and debt capital at each stage of its life-cycle is critical. This DA will discuss important cases where startups and mature companies have successfully raised capital. The discusion will also enable participants to hone their negotiations skils and discuss terms required by capital providers for financing commercial initiatives.	Ramin Khadem Wim Steenbakkers
Aug-3	**DA3: LIVING DISRUPTION: VISION AND STRATEGIES** Disruptive technologies generally gain abnormally high market share by lowering cost and/or creating new markets. In this session the panelists will discuss how new technologies are enabling completely new markets in the space industry, while enabling participants to understand the global status of new ventures and their underlying success. Participants will be able to ask questions and discuss their thoughts on disruptive business models.	Michael Simpson Harvin Moore
Aug-4	**DA4: ISRAEL AEROSPACE INDUSTRY PROFESSIONAL VISITS - IAI MBT SPACE DIVISIO** Joint activity with APP. Full day of professional visits to learn about the Israeli space industry and space applications. Morning visit to IAI's MBT Space Division, which is the prime contractor for all Israeli space programs and the largest satellite manufacturer in Israel. Guided tour of the show	Michael Simpson Harvin Moore Daniel Rockberger Janet Moore

	room, integration facility, and AMOS communication satellite control center to understand processes involved in satellite development up to full satellite integration, testing, and operation.	
Aug-4	**DA5: ADVANCED SATELLITE COMMUNICATION SOLUTIONS & SATELLITE OPTICS** Joint activity with APP continued. Afternoon visit to Gilat Satellite Networks Ltd., which is a leading provider of end-to-end satellite-based broadband communication solutions. It develops and sells VSAT satellite ground stations and related equipment. Gilat primarily focuses on consumer broadband, enterprise, cellular, and mobility applications for the commercial, public safety, and the defense sectors. Finally, a visit to Elbit Elop will demonstrate the development and production of complex space borne electro-optic observation systems. Learn about space telescopes and space cameras for military, government, and civilian space applications.	Michael Simpson Harvin Moore Daniel Rockberger Janet Moore
Aug-7	**DA6: MOONA – MODELS IN NEW SPACE/YOUNG ENTREPRENEURS MENTORING CLINIC** Management Department participants will visit MOoNA, located in the arab city of Majd Al Kurum in the Galilee northern region of israel. Participants will hold a Young Entrepreneurs clinic to mentor high school students (with experience in building and operating 3D printers, drones, and robots) to educate them in creating impact through space STEM entrepreneurship and commercializing ideas by successfully transitioning from lab to market. The activity is geared to enable MGB participants to gain a deeper understanding for how space STEM initiatives can be commercialized, and experience the value of providing service to the community through hands-on mentoring.	Asaf Brimer Harvin Moore Janet Moore Stacey Falzarano
Aug-8	**DA7: COMPETITIVE STRATEGY & GAME THEORY IN SPACE PART 1** Participants will deliberate on seminal commercial and policy initiatives in the space industry, and organizational responses to competitive dynamics, market opportunities, and emerging regulatory landscape. Space industry leaders will present theory and practice of how organizations evaluate opportunities and strategic risks, and achieve their goals through building commercial and competitive advantages to create a differentiation for their products, operations, and financing sources.	Stacey Falzarano Chirag Parikh
Aug-9	**DA8: COMPETITIVE STRATEGY & GAME THEORY IN SPACE PART 2** Continuation of Part 1	Stacey Falzarano Chirag Parikh
Aug-10	**DA9: ISRAEL'S REGULATORY ENVIRONMENT FOR COMMERCIAL SPACE** Participants will discuss the difficult balancing act that state regulators must strike between encouraging commercial private space actors, and governmental oversight & authorization. Israeli guests will be on a moderated chat with 2 parts. A) Israel's start-up space economy and connection to recent commercial space policy changes, including the insurance and risk underwriting aspects of the space industry B) development of space-focused international R&D agreements (as an example of how policy is being implemented). This is a joint Activity with PEL department.	Ian Christensen Ann Liebschutz Robert Sheige
Aug-14	**DA11: NEGOTIATING SPACE AGREEMENTS & ORGANIZATIONAL GOVERNANCE** Space industry, in addition to being capital intensive, has a unique risk/return and regulatory oversight profile. Buying, selling, and contracting for products and services (particularly spectrum) sometimes means investing in parts of the supply chain to ensure quality and access. This panel of lawyers and spectrum experts will discuss legal and regulatory cases and negotiation strategies they have undertaken to reach favorable outcomes for their clients. Joint Activity with PEL department.	Randy Segal Michael Mineiro Robert Shiege Andrea Harrington
Aug-15	**DA12: COMMERCIALIZING SPACE TECHNOLOGIES: BEYOND R&D** Space industry is R&D intensive, and requires a multi year investment in building underlying technologies and competencies that ultimately find way to market. Presenters will discuss models for investment, capital sources, risk evaluation, and developing/measuring success metrics across the spectrum of space technologies and industries globally.	Michael Safyan
Aug-16	**DA14: FINAL TEAM PRESENTATION** Each team will present an original idea for funding to the investment committee, justifying their recommendation with market need for the concept, investment amount requirement, path to commercialization, and the risk mitigants in execution. Each participant will be graded by a mock investment committee, inputs from which will be used to rank the top three ideas presented in this final DA.	Adil Jafry Allyson Reneau

Space Policy, Economics, and Law Department (PEL)

The Space Policy, Economics, and Law Department concentrates on the "why" and "how" of international space activities.

Participants joining the Policy, Economics, and Law (PEL) department will be involved in a range of discussions, debates, and interactions designed to provide an in-depth understanding of what shapes current and future space activities around the world, along with their societal impacts, justifications, benefits, and the international and national legal frameworks within which space activities are conducted. A range of international political, economic, and legal experts will work with participants on topics that include:

- What are the geopolitical context and pressures of activities in space?
- What are the political and economic drivers that persuade governments to invest in national space programs?
- How do we measure the success of national and international space programs?
- How well are nations cooperating in international space projects?
- How and why are laws regulating national space activities enacted and what are the differences?
- How effectively do space agencies deliver national benefits and how are they measured?
- Do the space treaties adequately address the current and future needs of the international space community?
- What are the obstacles to change in international space law?

Participants joining the department will have a diversity of professional backgrounds. All participants will take advantage of the PEL Department's expertise and insights to broaden their knowledge and understanding of the political and legal foundations of international space activities.

Department Chair

Christopher Johnson
USA/UK

Teaching Associate

Andrea Harrington
USA

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: DEPARTMENT INTRODUCTION** Participants will receive an overview of the Space Policy, Economics, and Law (PEL) Department, the 13 PEL department days, and their individual assignment. DA 1 will focus on international law in the international political system, and the subjects and sources of international law.	Chris Johnson Andrea Harrington
Aug-2	**DA2: SPACE POLICY - RATIONALES AND APPROACHES TO SPACE** Participants will learn the policy rationals for conducting space activities, and the four doctrinal theories for governmental approaches to space (Space Sanctuary, Space Control, Space as a High Ground, Space Survivability). National space policy, the organization of state activities, and regulation/oversight of national activities will be discussed.	Deganit Paikowsky Joan Johnson-Freese Phillipe Clerc Michael Simpson
Aug-3	**DA3: THE OUTER SPACE TREATY OF 1967** Participants will be briefed on the various United Nations forums on outer space (COPUOS & CD), along with the history, status, fundamental principles of the Outer Space Treaty and subsequent treaties.	Steve Mirmina Tanja Masson-Zwaan Philippe Clerc
Aug-4	**DA4: LEGAL AND ECONOMIC STATUS OF OUTER SPACE** Participants will be briefed on the legal and economic status of outer space, including res nullius, res communis, res extra commercicum, commons and the "tragedy of the commons", the global commons, and common pool resources. The legality of asteroid/moon mining and resource use will be discussed.	Steve Mirmina Tanja Masson-Zwaan

Aug-4	**DA5: INTERNATIONAL COMPETITION, COLLABORATION, AND COOPERATION IN SPACE** Participants will be briefed on the legal aspects of international cooperation in space.	Steve Mirmina Tanja Masson-Zwaan Deganit Paikowsky
Aug-7	**DA6: SPACE WAR AND THE LAW OF ARMED CONFLICT IN SPACE** Participants will be briefed on the UN Charter and its prohibition on the threat or use of force, the Law of Armed Conflict, international environmental law, and geopolitical concerns impacting space. Analogies to other realms (air, sea, cyber) will be made, and a table-top war game exercise will be executed. Deadline for selection of INDIVIDUAL ASSIGNMENT	Deganit Paikowsky Ram Levi
Aug-8	**DA7: MARS TREATYMAKING WORKSHOP PART 1** Partipants from the PEL and HUM department will discuss political and society aspects of Mars habitation, and plan a COPUOS simulation of the negotiation for a new international treaty for the Human settlement of Mars. Set 10 years in the Future.	Ruth McAvinia Geoff Steves Norah Patten Yevgeny Tsodkovich Steve Mirmina
Aug-9	**DA8: SPACE SITUATIONAL AWARENESS & ITS POLITICAL CONTEXT** Participants will receive an overview of the technical aspects of Space Situational Awareness, and then discuss the political and legal implications.	Pini Gurfel Ram Levi
Aug-10	**DA9: ISRAEL'S REGULATORY ENVIRONMENT FOR COMMERCIAL SPACE** Participants will discuss the difficult balancing act that state regulators must strike between encouraging commercial private space actors, and governmental oversight & authorization. Israeli guests will be on a moderated chat with 2 parts. A) Israel's start-up space economy and connection to recent commercial space policy changes, including the insuance and risk underwriting aspects of the space industry B) development of space-focused international R&D agreements (as an example of how policy is being implemented). This is a joint Activity with MGB department.	Ian Christensen Ann Liebschutz Robert Sheige
Aug-10	**DA10: MARS TREATYMAKING WORKSHOP PART 2** Partipants from the PEL deparment will conduct a simulation of the UN Committee on the Peaceful Uses of Outer Space (COPUOS) set 10 years in the future, to plan the habitation and settlement of Mars. 1 paper and 1 poster from this workshop will be presented at IAC 2016.	Chris Johnson Andrea Harrington
Aug-14	**DA11: NEGOTIATING SPACE AGREEMENTS AND & ORGANIZATIONAL GOVERNANCE** Space industry, in addition to being capital intensive, has a unique risk/return and regulatory oversight profile. Buying, selling, and contracting for products and services (particularly spectrum) sometimes means investing in parts of the supply chain to ensure quality and access. This panel of lawyers and spectrum experts will discuss legal and regulatory cases and negotiation strategies they have undertaken to reach favorable outcomes for their clients. This is a joint Activity with MGB department.	Randy Segal Michael Mineiro Robert Shiege Andrea Harrington
Aug-15	**DA12: CURRENT DEVELOPMENTS IN SPACE POLICY AND LAW** Participants will be briefed on the COPUOS Long-term Sustainability Guidelines, the draft International Code of Conduct on Space Activities, the GGE report on TCBMS in space, the PPWT, the COPUOS High-Level Forum & UNISPACE+50 in 2018, along with recent actual developments in outer space.	Chris Johnson Andrea Harrington
Aug-16	**DA12: FINAL PRESENTATION AND PEL SUMMATION** Participants will present their individual assignments at the conclusion of the department.	Chris Johnson Andrea Harrington

Space Sciences Department (SCI)

Space sciences introduces the principles, concepts, tools, and techniques necessary to investigate and understand the space environment. Department activities provide hands-on opportunities to learn about space sciences from experts in the field.

Participants will work with telescopes to learn the fundamentals of astronomy and astrophotography. They will learn how to remotely operate a rover to conduct science missions. They will learn about the microgravity and near space high altitude environment. Through these activities they will build an overall understanding of space sciences with support of department faculty and lecturers.

Participants will prepare and present on a subject of particular interest, agreed upon with the departmental team. Entering the exciting world of space sciences does not require a degree in science or engineering; participants from all backgrounds are encouraged to apply.

At the end of the department, the participants should be able to:

- Understand the science and operational aspects of conducting a teleoperated simulated rover mission by taking on a specific role as part of the operational team
- Develop and conduct a stratospheric balloon and microgravity experiment
- Obtain and process astronomical images using available cameras and telescopes
- Conduct individual science research or experiments through interaction with local experts

Department Chair

Dr. Rene Laufer
Germany

Teaching Associate

Dan Cohen
Israel

Date	Department Activity (DA) Description	Activity Lead
Jul-31	**DA1: WELCOME AND DEPARTMENT INTRODUCTION** A general welcome to the participants in the department, and an introduction to the department and schedule of activities. A briefing on the department policies, the department portion of the grading, and what is expected of the participants. An introduction to the department resources available for help in studying for the exam, their individual project, as well as for their TP work. Experimental equipment and observational opportunities will be described for participants interested in hands-on individual projects.	Rene Laufer Dan Cohen
Aug-2	**DA2: ISRAEL OCEANOGRAPHIC AND LIMNOLOGIC RESEARCH INSTITUTE VISIT** Visit to the Israel Oceanographic and Limnological Research (IOLR) oceanographic facilities in Haifa to learn about experiments for maritime research. IOLR is a national research institution (non-profit governmental corporation) established in 1967 and it conducts scientific research in the fields of oceanography, limnology, mariculture, and marine biotechnology. Joint with APP.	Reut Abramovich Rene Laufer Dan Cohen Su-Yin Tan Petter Skanke
Aug-3	**DA3: ROBOTIC PLANETARY EXPLORATION ANALOGUE MISSION - PLANETARY SCIENCE** Participants will be provided with an overview of the scientific and exploration objectives of planetary exploration missions, and solar system destinations of interest for surface exploration missions will be discussed, including key findings from past and current missions and the rationale behind targeting new destinations. Participants will be divided into teams where they will work towards defining the scientific and ISRU objectives of a planetary exploration mission. Provided with a mission architecture and remote sensing data from the targeted destination, they will develop a mission concept, propose payloads to accomplish the scientific objectives. All within the constraints on mass, power and communications such that the teams will optimize the use of sensors to maximize the mission objectives. Joint activity with ENG department	Ewan Reid Peter Visscher Melissa Battler Michaela Musilova
Aug-4	**DA4: BALLOON MISSION I - INTRODUCTION AND FINAL DESIGN** This activity will allow the participants to learn about how to design and execute an experiment on a high altitude balloon. The payload will be attached to a stratospheric balloon and will fly up to about 30 km. Part of the payload will be a drone that will be programed to get back to the initial coordinates and will have a release mechanism so that it will detach from the balloon and come back. This DA is an introduction to all parts of the mission and is collaborated among departments, assignments will be distributed to participants at the end of the session.	Maya Glickman-Pariente Vera Gutman

Aug-4	**DA5: ROBOTIC PLANETARY EXPLORATION ANALOGUE MISSION - MISSION PLANNING** Leverage the knowledge from the preliminary workshop to prepare for mission simulation the participants will be provided with an outline of the process that government agencies and private companies undertake when developing mission architectures and an explanation of the specific objectives and rules for the mission simulation. Divided into mixed teams made of ENG and SCI department participants they will be required to develop mission objectives (science or ISRU related) and mission requirements as well as defining the operations concept for the mission using available mobility and vision/sensor systems and generate procedures for real-time operations. Joint activity with ENG department.	Ewan Reid Peter Visscher Melissa Battler Michaela Musilova
Aug-7	**DA6: BALLOON MISSION II - TESTING** Participants will try to communicate with the ground station which will be built by the SCI department and test the link remotely to make sure we will have a good connection in the air to get the products.	Maya Glickman-Pariente Vera Gutman
Aug-8	**DA7: RPEAM - MISSION SIMULATION/ARTIFICIAL AND MICROGRAVITY - PREPARATION** Taking place at both the SSP site and the analogue site in North America where the Small Planetary Rover Prototype (SPRP) - developed by Ontario Drive and Gear (ODG) - will be deployed and each team will execute their mission plan in order to meet their mission objectives. Participants will control the rovers at the analogue terrain via remote tele-operation from the control center on campus in Haifa. They will have to work as a real operations support team using radios/voice loop communications and potentially communications delays or limited bandwidth. Each team will have a fixed time available in which to achieve mission objectives with additional points being awarded for saving time, energy, bandwidth, etc. Joint activity with ENG.	Ewan Reid Peter Visscher Melissa Battler Michaela Musilova
Aug-9	**DA8: ARTIFICIAL AND MICROGRAVITY - PREPARATION/RPEAM - MISSION SIMULATION** Research in a microgravity environment is currently conducted using several platforms: ISS, aircraft parabolic flights and drop towers. The intention of the workshop is to demonstrate the influence of changing gravity on physical systems. We will achieve this objective by flying acrobatic maneuvers with a special glider plane, which will allow us to exert gravity levels from -1g to micro-g (approx. 0g) and up to 4 g. Participants will have the opportunity to learn about the possible science and research and how to conduct investigations in these fields. They will also be invited to conceive how to prepare and conduct an experiment by themselves to allow for an intriguing hands-on experience.	Norbert Frischauf David Degani
Aug-10	**DA9: BALLOON MISSION III - LAUNCH** Participants will launch the stratospheric balloon together with local experts (MER company) with the payload attached and try to communicate with the onboard transceiver and locate the drone as it comes back. They will analyze the data received and the payload retrieved to conclude the balloon experiment as soon as data and payload are available.	Maya Glickman Joe Pellegrino Cory Newman
Aug-10	**DA10: INTRODUCTION TO ASTROGEOLOGY / BALLOON MISSION IV - POST-FLIGHT ANALYSIS** The Ramon crater area - near the city Mitzpe Ramon in the Negev desert and the Florence and George Wise Observatory - is a great Mars analogue environment for astronaut field geology training while waiting for further post-flight balloon data being available. In this activity, the participants will perform hands-on geology and planetary science, experience field geology as an astronaut (including impaired dexterity and vision) and compare terrain exploration “as a rover” vs. as a human.	Shai Kaspi Maya Glickman-Pariente Vera Gutman Reut Abramovich Ewan Reid Peter Visscher Melissa Battler Michaela Musilova
Aug-14	**DA11: ARTIFICIAL AND MICROGRAVITY - POST-FLIGHT ANALYSIS** Participants will analyze the results and observations from the artifical gravity flight experiments.	Norbert Frischauf David Degani Vladimir Pletser
Aug-15	**DA12: INTRODUCTION TO OBSERVATIONAL ASTRONOMY** David H. Levy, one of the most enthusiastic and most famous amateur astronomers of our time, will offer a brief introduction to the world of astrophotography, from the very simplest star trails images, to pictures that capture artificial satellites launched by space agencies, and finally to the thousands of patrol photographs he takes in search of new comets. There will be plenty of time for a good discussion during this workshop - enabling participants to acquire images of celestial objects in the day or night sky afterwards. Participants are invited to bring their own cameras if they have one.	David Levy
Aug-16	**DA13: PARTICIPANT INDIVIDUAL RESEARCH PRESENTATIONS** The space sciences department participants will present their individual research assignments at the conclusion of the department.	Rene Laufer Dan Cohen

Fundamental Workshops (FWS)

(Please Note: FWS are **mandatory** for all participants)

Date	Workshop Description	Activity Lead
Jul-17 Jul-18 Jul-19	**Team Project Managment and Foundation Skills** The Team Project (TP) enables SSP participants to work in interdisciplinary and intercultural teams to produce either a comprehensive analysis or proposal for an international space project or work on a topic relevant to the professional space sector. This workshop will discuss project management skills, scheduling and communication basics, and the typical TP report workflow, structure, and deliverables. Participants will gain a clear understanding of the planning, scheduling, leadership, and team-building tools necessary to manage a successful ISU team project.	Su-Yin Tan Chris Welch
Jul-17 Jul-18 Jul-19	**Report Writing and Presentation** The participants will be given materials and strategies for completing Departmental assignments, writing TP reports, and writing for the essay exam. The workshop will include a review of the major ISU Style Guide sections on report writing and presentation, with emphasis on successful communication in the ISU multicultural environment.	Carol Carnett
Jul-17 Jul-18 Jul-19	**Team Building** This interactive workshop aims to foster 'expeditionary behavior' in SSP participants", encouraging behaviors and attitudes so that you can support team projects and other group activities during SSP more effectively and efficiently. Workshop activities are designed to test communication skills, lateral thinking, and team decision-making processes; with a specific focus on participants self reflecting to identify their personal strengths and weaknesses, recognizing the specific requirements of a task, and determining how to best utilize the strengths within their culturally diverse team to overcome various challenges.	Josh Richards
Jul-20	**Media Training and Crisis Communications** This workshop will provide participants with a sense of media relations, interview techniques, as well as an introduction to communication in case of a crisis in the space transportation field. Participants will: • learn how crisis communication is managed (and mismanaged) using examples in the space sector; • learn about the importance of preparing for crisis communication; • practice in dealing with a journalist's interview or a media conference.	Juan de Dalmau

Elective Workshops (EWS)

(EWS will be held on Jul-26, Jul-27, and Aug-16. Participants are required to choose one workshop for each slot. Participants are encouraged to choose some workshops from unfamiliar disciplines.)

Date	Workshop Description	Activity Lead
EWS 1 (Jul-26) EWS 2 (Jul-27)	**ISU LEGO Robotics Competition (Must sign up for both Jul-26 and Jul-27)** Participants will design, program, and operate a real robot. Participants are assigned to develop an autonomous robot to accomplish the given task, possibly for planetary exploration. Through this activity, participants will learn the process for making their ideas work in a real environment and how to improve their designs through prototyping, testing, debugging, and rebuilding.	Eric Choi

EWS 1 (Jul-26)	**Space Mining - future prospects and the geopolitical challenge** Once space mining has become technologically and economically feasible, it will have a dramatic and disruptive effect on the global economy and world politics. This development will have significant consequences for security and global stability, affecting a large number of countries regardless of their space capabilities. Nevertheless, the social and political aspects of space mining were not yet addressed by international relations and political economy experts and scholars. It is vital to develop novel political, economic and legal frameworks of thought on such issues in advance. To that purpose, and as a preliminary exercise, the workshop will challenge students to deal with the future political, economic and legal aspects of space mining. The workshop will include a presentation of the main issues at-stake raising the central questions to be asked and offer directions for answering them.	Deganit Paikowsky
EWS 1 (Jul-26)	**Rosetta, Mission: Possible** On 12 November 2014 the Philae lander separated from mother craft Rosetta and landed successfully on comet Churyumov-Gerasimenko, after a journey of more than 10 years and 6.5 billion kilometres throughout the solar system. This event was a highlight in the extraordinary mission of Rosetta, after already 4 gravity assist manoeuvres, 2 asteroid flybys, and 2 ½ years in hibernation. Since then the main science mission of Rosetta has taken place in the close vicinity of the comet nucleus, including comet's perihelion on August 13th, 2015. Rosetta is now preparing an exciting end of mission where the spacecraft will slowly reach the comet's surface after a series of spiraling orbits. This is planned to take place in September 2016. The Rosetta spacecraft was built under the prime contractorship of Airbus Defence & Space Germany (Friedrichshafen). Airbus Defence & Space UK (Stevenage) developed the mechanical platform including propulsion and solar array, whereas Airbus Defence & Space France (Toulouse) delivered the spacecraft's avionics including data handling, attitude and orbit control, and of course the central software. The workshop includes a complete presentation of the mission and spacecraft, and a number of "hands-on" activities to better figure out the interplanetary journey and cometary environment. By the end of the workshop, participants will understand gravity assist maneuvres, spacecraft power and communication delays as a function of the distance to the Sun and Earth respectively, and comet's gravity field, sphere of influence and escape velocity.	Vincent Guillaud
EWS 1 (Jul-26)	**Ramon Space Lab- Bringing Space into the Classroom** The workshop will expose participants to the unique process facilitating the program, and will have students from the Ramon Space Lab program take part in it, sharing their experience from this process. Following the introduction, participants will work in groups according to the NASA and the Israeli Air Force methodology, and will work together on an experiment simulating the various challenges encountered by the students, concerning, among other factors microgravity, safety, and the major challenge of fitting such a feat into a small test-tube. Ramon Space Lab (RSL) is the space education program of the Ramon Foundation, a nonprofit named after the first Israeli astronaut, Ilan Ramon, and his eldest son, Assaf Ramon. The program is designed to encourage middle school students to major and excel in STEM by enabling them to send a scientific experiment to be performed on the International Space Station. The program spans two years, allowing students involvement in a significant process which enables them to develop foundational abilities such as independent thinking, cooperative group work, curiosity and problem solving skills as well as imparting scientific knowledge, with a strong affinity to the field of space sciences.	Maya Golan

EWS 2 (Jul-27)	**Strategic Planning in Satellite Telecommunication Industry** Satellite Telecommunication is the largest (by revenue) part of the aerospace Industry. This workshop will provide comprehensive insights into the key factors influencing corporate strategy of a satellite operator and strategic planning process. The activity will be structured around key areas: • What is Strategy and why we need it? • What is the business environment of a satellite operator? • What are the key factors influencing the strategy of a satellite operator? • Strategic Planning process: how do we come up with our strategy? In this session you are also given the opportunity to be in the driving seat of the Executive Committee, experience strategic decision-making for a fictitious satellite operator company and execute your own strategy. Your decisions can lead to company success or... failure. The only way to win is executing on a good strategy!	Violetta Kuvaeva
EWS 2 (Jul-27)	**Space Operations Workshop** This workshop will simulate actual space operations situations, with participants playing the parts of various operational specialists. Participants will be introduced to the various roles that space operators fulfill, and will receive some "training" in their operational specialty. The workshop instructor will then introduce both nominal and off-nominal situations and the participant "operations team" must respond to. This type of exercise is used extensively for the training of operations personnel for both space agencies and commercial space companies around the world, and will emphasize the importance of planning, training, and in-flight operations teamwork.	Emily Nelson
EWS 2 (Jul-27)	**Space Debris Workshop** This workshop focuses on the space debris problem. The introduction describes how polluted the low-Earth orbit environment is and what collision risk debris poses to operational satellites. Methods how to protect a spacecraft against space debris and design measures to control the growth of debris are presented. International activities to mitigate the space debris problem are analysed and finally active techniques to reduce the number of space debris (removal of debris with laser, tether, air-drag devices, garbage collectors) are proposed. After the theoretical introduction the participants will use the MASTER-model to calculate the average number of debris impacting on the ISS and other spacecraft. At the end of the workshop a competition will take place where the teams have to find the "safest" orbit for a space telescope. And there is chocolate for the winning teams!	Rüdiger Jehn
EWS 2 (Jul-27)	**Space Operations Analogs** Space operations analogs such as the MDRS, HiSEAS, MOONWALK, ESA CAVES, NASA NEEMO, ROSCOSMOS/ESA Mars-500 and other similar facilities programs allow for crew training in flight-like environments and cost-effective research into crew dynamics, operational procedures, crew diet, equipment testing, ergonomics research, crew psychology, mitigation measures and more! Many ISU Alumni have participated in, and conducted these studies, the most recent of which was the Moonwalk EU Analog Study in April of 2016. In this workshop you will receive an overview of space operations analogs and work with your classmates to design a space analog operations experiment for the proposed International Space Analogs station in Israel.	Joshua Nelson Roy Naor Jonathan Faull
EWS 2 (Jul-27)	**Space Outreach - Practice** In this workshop, participants will practice some of the concepts covered during the Core Lecture on Space Outreach and Communication, by conducting exercises on: • Delivering an "elevator pitch" to trigger the interest of an important person with a few sentences; • Designing outreach plans based on the audience's interests and expectations; • Preparing and delivering a presentation having the audience's needs in mind, and the action the speaker expects the audience to take afterwards.	Juan de Dalmau

EWS 3 (Aug-16)	**Space, a new frontier for ethical interrogation** More than half a century after its birth, Space remains a new frontier for humankind. From one side, space technologies are modifying our life on Earth: henceforth we cannot imagine to live one hour, perhaps one second, without the fleet of satellites above our heads. From the other side, space exploration provides constantly new and disturbing knowledge about our place in the universe and its history. Space is changing our human condition. In the same time, a "newspace" is emerging with new actors, new rules (private industries, space tourism, asteroids mining, etc.). Ethics is requested to approach this new chapter of Space history.. . if ethics is first interrogative: Why? How? With which consequences are engaged space activities? Ethics is a real new frontier for space actors.	Jacques Arnould
EWS 3 (Aug-16)	**Business models for new space – How to design your new space company** In this elective workshop we will look at how space companies are organized. We will start by looking at traditional organization models, briefly linking back to the management and business core lectures . Then we will look at how these business models are evolving over time. How is it possible that new startups are becoming very successful very fast, while old company models have trouble keeping up. How does disruptive changes in society, economy and technology create new opportunities for aspiring entrepreneurs? And how do these new space entrepreneurs organize themselves in new networks of small and medium enterprises? This workshop is aimed both at aspiring entrepreneurs and people aspiring management positions in larger organizations. This workshop will consist of some theory, many new space examples and a lot of hands-on work. We will use the business model canvas as a template to design our own space organization. This method is widely used by organization design consultants in many industries and is a real eye opener for anyone managing a small or large organization.	Remco Timmermans
EWS 3 (Aug-16)	**Extending the Reach of Outreach** Outreach events are a key way of promoting science, technology, engineering, and mathematics to those not working in them every day. But sometimes outreach turns to "inreach" when communication is only done with people who are already interested in the topics. In this workshop, we will look briefly at what published research tells us about the public's engagement with science and technology and how this evolved from older models of public understanding of science. We will then work on ideas to improve engagement with space science and technology in the wider community. We will identify groups in our communities who are not served well by outreach, and come up with innovative, fun, and informative ideas for new outreach projects. In teams, we will develop these ideas for a final presentation – this could be a completed product such as a street performance, or a detailed plan for a new exhibit or outreach campaign. It's time to get out of the lab and the lecture theater and into the community.	Ruth McAvinia
EWS 3 (Aug-16)	**STK Workshop** STK is one of the best space mission simulation tools in the market today, giving you the power you need to create the most effective and optimized space mission around. Maya Glickman-Pariente, the lead for this workshop, is a veteran space engineer and entrepreneur, using STK for the past decade in numerous complex space missions (in Israel and worldwide). In the workshop the participants will learn about how satellites fly through space, how to plan their own space vehicle routes and orbits, and how to design and plan a space mission with one of the most powerful tools around.	Maya Glickman-Pariente
EWS 3 (Aug-16)	**Radar Image Processing Workshop** This hands-on computing workshop will discuss image signal processing and applications of an active remote sensor, Synthetic Aperture Radar (SAR). SAR is a multipurpose sensor that can be operated in all-weather and day-night time, especially for tropical area monitoring. Participants will gain experience with digital image processing of satellite data utilizing local datasets. We will explore the fusion and enhancement of optical and radar imagery collected from space.	Su-Yin Tan

Team Project - Artificial Gravity

Introduction

One of the key challenges of long term human presence for exploration and research in low earth orbit is the microgravity environment. This environment is a key enabler for research on today's International Space Station, but is also a major factor contributing to negative effects on the human body and mind.

In order to expand the capabilities of a future orbiting station the element of artificial gravity may need to be added. This team project will look into the design challenges of a large orbiting facility in low earth orbit. This orbiting facility should not only support microgravity and other space-based research, but also be a place to live, work and visit for much larger numbers of people than current space stations.

The Artificial Gravity Conceptual Vehicle Design includes key engineering and design considerations for a crewed low earth orbit space station, which uses rotation to provide artificial gravity. It will have a section which will provide a microgravity environment for research and manufacturing, and a section which will serve as the docking location for the station. This vehicle will be a grand complex. It is designed to be orbited in the 2035 to 2040 timeframe, and it will make living and working in space commonplace. The station will be very large and provide an environment compatible with work and tourism. It is expected that up to 200 people may reside on the complex at any one time. Workers and their families will live on board. A hotel to house tourists will be part of the complex. There will be schools, stores, green areas with ponds or streams, a cinema, restaurants etc.

Background

This TP has been proposed by a commercial entity that is not currently associated with ISU. The proposal asks for ISU to study an artificial gravity LEO facility for the commercial customer, but authorizes open release of the study results.

Objectives

Conceptual design and associated analyses of a commercial artificial gravity (AG) LEO space station.

Tasks

1. An overall technical description of the operational AG Space Station. This should include:

- Recommended overall AG Space Station configuration and system layout
- Interior layout including:
  - Rotating section - hotel, shops, schools, recreational areas, crew and family living areas, docking facility and other key areas defined for this section.
  - Non rotating section – laboratories, manufacturing areas, Earth and space sensing instruments, docking/berthing bays.
  - Crew and logistics transfer capability from the center non rotating section to the rotating section.
- Structural analysis demonstrating the capability of the vehicle to accommodate rotational loads.
- Dynamic analysis demonstrating expected levels of vehicle dynamic response (e.g., nutation) to internal disturbances such as crew movement and to external disturbances such as atmospheric drag. If deemed necessary, techniques to counter these dynamic excursions should be developed.
- AG Space Station recommended orbital orientation and rendezvous techniques for visiting crew and cargo spacecraft.
- Techniques for orbit maintenance of AG Space Station Resiliency to temporary loss of spin capability (or explanation why this is not an issue to consider)

2. An overall description of the trades and recommended technical solutions involving major AG Space Station systems including at a minimum:

- Life Support
- GNC
- Attitude control systems (propulsion, gyros, other) • Power
- Communications
- Thermal Control
- Crew Accommodations
- Depress/Repress system

3. Resupply strategy for the AG Space Station. The resupply needs should be traded against system design (e.g., life support closure level vs. consumable needs)

4. Launch and assembly strategy of the AG Space Station should attempt to minimize launch costs while remaining consistent with the ground rules and constraints. This analysis should include at a minimum:

- Launch packaging
- Assembly technique (each assembly step should be stable until the next section arrives)
- Spin-up technique

5. Suggest an appropriate name for this facility.

6. Business case analysis for an AG LEO facility, including identification of commercial and other customers.

7. Analysis of the legal framework for a commercial LEO facility

Conclusion

This proposed TP examines a commercial space project, without consideration to nation of development, launch, operation or servicing. Unlike team projects that address specific issues of national space agencies or geographic regions, a commercial project of this type can be implemented by any a broad range of international or commercial interests, and offer services to a broad international customer base.

ISU is being asked to perform this TP for the unique international and intercultural perspective that the ISU participants bring to this task.

Suggested References

- Artificial Gravity, 2007 (book), Gilles Clément and Angie Bukley
- Artificial gravity as a countermeasure for mitigating physiological deconditioning during long-duration space missions (Clément, Bukley, Paloski, Frontiers in Systems Neuroscience)
- Website http://www.artificial-gravity.com/

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Team Project - Implications of New Discoveries in the Martian Environment

Introduction

Recent Mars missions have revealed a new perspective on the Martian geological and atmospheric environment, including an abundance of groundwater and the presence of regolith perchlorate concentrations. These findings may provide important resources for Human exploration and insight into Martian history while at the same time posing new challenges.

Water, and in particular flowing water, is important for life as we know it on Earth and an important resource for any future Human colony on Mars. While perchlorate may pose a significant hazard to future space missions, it may be potentially leveraged as a resource. By studying the origin and utilization of Mars environmental resources on Earth, we gain a better understanding of potential risk and use on Mars.

Background

Our species will visit and colonize Mars. As we analyze data from our current and past robotic missions to Mars, we get a new view of our neighbor, a view that includes both opportunities and risks.

Life, as we know it, and our species requires liquid water to sustain itself. When Italian astronomer Giovanni Schiaparelli observed Mars in the late 1800's he observed a network of lines that were interpreted as canals. These interpretations changed as telescope resolution improved. In 1971, Mariner 9 returned images of dry riverbeds and canyons that seemed to indicate that water had existed on the Martian surface. Recently, analysis of rock samples examined by the Mars Exploration Rover Opportunity has confirmed an ancient wet environment that was favorable for microbial life. Analysis of data obtained by the Mars Reconnaissance Orbiter provided direct detection of water in the form of hydration of salts.

On Earth, perchlorate occurs both naturally and as a manufactured compound. Perchlorates are used extensively within the pyrotechnics industry, and ammonium perchlorate is also a component of solid rocket fuel. Perchlorate was detected by Phoenix as the perchlorate ion in solution. Reanalysis of the Viking Gas Chromatography Mass Spectrometer (GCMS) results implied its presence at the Viking sites. The Sample Analysis at Mars (SAM) instrument on Curiosity is detecting perchlorate by the release of oxygen and chlorinated organics when samples are heated.

The Mars environment presents both challenges and opportunities for space exploration and the potential for life. What will it take to make Humans on Mars a science reality and not science fiction? When will our species truly step out of our nest called Earth?

Objectives

The primary objectives of this Team Project include:

- Reviewing Mars geological and atmospheric environment with an emphasis on recent Mars environment findings.
- Studying the implications of the new discoveries on future Human space exploration missions to Mars and how they can be used as in-situ resources for life support and habitability.
- Discussing the biological implications of the recent Mars findings on Space Biology, Astrobiology, Human health, terraforming and Synthetic Biology.
- Drafting a Mars Human space exploration science and technology roadmap that outlines the priorities needed to further understand the potential use and effect of the new discoveries on crew and hardware.
- Producing a final report with recommendations that will inform decision makers and influence future Human space exploration missions to Mars.

Tasks

The tasks required to achieve these objectives include, but are not limited to:

- Survey of current understanding of the Mars environment with an emphasis on new discoveries. Research the implications of the new discoveries based on Earth and space analogue observations and results.
- To review National and international Mars exploration goals set by various committees (MEPAG, ISECG, etc.)
- To list the Mars environmental challenges and opportunities for Human space exploration.
- To review ISRU technologies and suggest new approaches utilizing the new discoveries, such as converting in-situ materials and 3D printing to support human space exploration
- To describe and suggest instrumentation for future Mars missions or strategize on mission designs around the presence of the new discoveries. (Optional)
- To discuss how the new discoveries affect us on Earth and potential national and international implications. (Optional)
- To produce a document that summarizes the findings and recommendations in a format that can inform decision makers and be used to develop a conference paper or position article.

Suggested Reading

- Hecht, M. H., et al. “Detection of perchlorate and the soluble chemistry of martian soil at the Phoenix lander site.” Science 325.5936 (2009): 64-67.
- Leshin, L. A., et al. “Volatile, isotope, and organic analysis of martian fines with the Mars Curiosity rover.” Science 341.6153 (2013): 1238937.
- Connerney, J. E. P., et al. “Magnetic lineations in the ancient crust of Mars.”Science 284.5415 (1999): 794-798.
- Stern, J. C., et al. “Evidence for indigenous nitrogen in sedimentary and aeolian deposits from the Curiosity rover investigations at Gale crater, Mars.” Proceedings of the National Academy of Sciences 112.14 (2015): 4245-4250.

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Team Project - Space Big Data

Introduction

In recent years the global data volume growth has been forty percent each year, the number of bytes created daily is 10 to the power of 18 and the number of servers used by big data companies ranges up to the millions. Although a lot of the data acquired might seem useless to the general population, governments, academia, and industry are learning how to use your location check-ins, your car engine temperature log and your cell phone reception quality history to make conclusions about the public mood and opinion, about traffic patterns and about environmental parameters such as air quality.

Space related research and space based observations are great contributors of big data. Satellite telemetry, sensor data, observation logs and manned space mission studies all produce enormous amounts of information that can be examined again and again to understand more about our universe, our solar system, our planet and our body.

The Big Data Space Information TP will examine the world of big data with the eyes of the space community; the TP will map the data creators, the data depositories, the data managers and data consumers related to space and space based activities. The TP will then find ways to better the data flow from sensor to processor to general public. The TP should evaluate ways of using and reusing data acquired by space based and terrestrial sensors to learn as much as possible about the universe around us, the leading question should be "how do I make new conclusions on other matters from all the data available to me". The TP will need to take into consideration the technological challenges in data management as well as the legal and ethical issues that stand between protecting privacy and intellectual property and the general good.

Background

In the past twenty years the leading question in the acquisition of knowledge and data has changed from "is the answer out there?" to "how do I find the most relevant answer out of the data haystack?". The quests for both obtaining and presenting the most accurate and relevant data are very important to space related research. As more and more private and public organizations conduct space related missions for Earth observation, space exploration and other scientific research using advanced sensors that pour trillions of bytes into data depositories there comes a need to manage the flow and dissemination of information. Leading research and development organizations, such as NASA and Google, employ whole departments dedicated to the management of knowledge and the improvement of data flow and conservation. Other organizations such as ESA have started annual space data conferences which discuss the matter of data management, processing and dissemination. There is a need to better the flow of space related knowledge not only within a single organization or research discipline but globally, to all stakeholders.

Management of data requires consideration of many aspects that range from the technicality of holding and processing the data through issues of ownership, accessibility and privacy to matters of accuracy, reliability and subjective bias prevention.

Today, most of the space related data is available on the World Wide Web. However, this data and knowledge is distributed in many depositories and points of access. Although the abundance of space related databases has its advantages such as redundancy, lower susceptibility to biases and a broad reach to different communities, it also has disadvantages in matters of quality assurance, the format unification required for research and the danger of "not seeing the whole picture".

There is a need for a building a central data warehouse, a database of databases arises.

Objectives

The primary objectives of this Team Project include:

- Mapping the players and stakeholders in the knowledge flow process, from data acquisition, through data processing, data storage, data-based applications and utilities to data dissemination.
- Studying the benefits and hurdles and the different aspects (research, social, legal, technical) in holding a central point of access to space related data.
- Drafting a roadmap and recommend strategic actions that the space community in general and data providers (e.g., agencies, universities, companies, research institutes) in particular should implement to improve the knowledge flow process.
- Realizing the positive educational experience in learning how teamwork and problem solving are achieved in an international, multicultural, and multidisciplinary environment with time and resource constraints.
- Producing a high quality report with practical and actionable recommendations that will assist decision makers and influence the future space related knowledge processes.

Tasks

The tasks required to achieve these objectives include:

- To research, Identify and map current situation of space data to draft the current and near future space related knowledge flow.
- To point out the obstacles, hurdles and tasks in data sharing and fusion on the legal, ownership, privacy, technical and proper use aspects.
- To draft an optimal (and feasible) situation for the flow of space related knowledge and data.
- To analyze specific case studies, in space sciences research fields and in space services fields, while referring to the current and desired states.
- To define a set of parameters that could track the implementation of the strategy in short and long term.
- To find document and to produce practical and actionable recommendations that will assist decision makers and influence the future direction of space related knowledge processes.
- To produce all required SSP deliverables that will document the team's work, conclusions and recommendations and use these deliverables to produce conference papers to the 2016 International Astronautical Congress and the 2017 ESA Conference on Big Data from Space.

Suggested Reading

- NASA Data Portal - https://data.nasa.gov/
- NASA Office of the Chief Knowledge Officer - http://km.nasa.gov/
- Proceedings of the 2016 ESA Conference on Big Data from Space - http://congrexprojects.com/2016-events/16m05/introduction
- Proceedings of the 2014 ESA Conference on Big Data from Space - https://earth.esa.int/web/guest/events/all-events/-/article/2014-conference-on-big-data-from-space-bids-14-research-technology-and-innovation-rt-i-

Chair
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Associate Chair
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Teaching Associate
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Public and Evening Events

Distinguished Lecture - The Hubble Space Telescope: A Quarter Century of Science

Wednesday, July 13

Speaker: Jeff Hoffman

Since its launch, the Hubble Space Telescope has become one of the most extraordinary and beloved space science missions, and has provided some of the most memorable images of the cosmos. But the telescope was not an immediate success - without the work performed by the STS-61 crew, including astronomer and NASA astronaut Jeffrey Hoffman, the Hubble could have been a scientific disaster. Dr. Hoffman will recall his shuttle missions and his experience as a space telescope "repair man", and how those repairs have led to the telescope becoming one of the greatest science instruments ever built.

Intercultural Awareness and Sensitivity

Thursday, July 14

Speaker: Margo Paz

Ms Paz has been a Cross Cultural Consultant and Trainer for the past 25 years. She founded and managed the only in-house Inter-Cultural Center at Amdocs in Israel. This is a concept which exists in very few global companies in the world. Over many years of experience, she gained vast knowledge and experience in training business people to work in, and relocate to, many different cultures of the world. Trained in Global companies like Facebook, Google, Intel, IBM, SAP, Samsung, Avaya and Phillips and in Israeli global companies like Amdocs, Nice, and Teva. In addition, she has experience conducting cross-cultural workshops at multinational and global companies worldwide - from the USA and Canada to Europe and Asia.

Margo Paz is also the founder and CEO of Globaleyes, a company specialized in conducting training and consultation in Country specific training, Cross-Cultural Communication, Global Management, Virtual Global Teams, and Global Customer Care.

Distinguished Lecture - John Kennedy, Richard Nixon, and the American Space Program

Sunday, July 17

Speaker: John Logsdon

The 1961 decision by U.S. President John Kennedy to send astronauts to the moon "before this decade is out" remains the most dramatic choice in space history, and on July 20, 1969, Neil Armstrong took 'one small step for a man, one giant leap for mankind.' The success of the Apollo 11 mission satisfied the goal that had been set by the US president, but also raised the question 'What do you do next, after landing on the Moon?' It fell to President Richard M. Nixon to answer this question, and his response has changed the course of the US space program ever since. 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" will discuss the reasons for Kennedy's decision and the steps the young president took to turn the decision into a successful Apollo program, and will discuss the deliberations by President Richard Nixon to end the Apollo program and put the US space program on a different course.

International Astronaut Panel

Monday, July 18

Panelists:

Sergei Krikalev, Russian cosmonaut, Soyuz TM-7/MIR, Soyuz TM-12/MIR, STS-60, STS-88, ISS Expedition 1, ISS Expedition 11

Jeff Hoffman, NASA Astronaut, STS-51D, STS-35, STS-46, STS-61, STS-75

Jessica Meir, NASA Astronaut Class of 2013, ISU alumna

The International Astronaut panel is an annual highlight of each ISU session. ISU participants and the public will have the opportunity to interact with this outstanding group of astronauts who represent over 30 years of international spaceflight experience ranging from the Soviet MIR station to the International Space Station, to train for missions in future spacecraft. The panel collectively represents over 3 years of spaceflight experience, and also includes an ISU alumna who was recently selected by NASA.

Sergei Krikalev holds the record for the most days in space by a human - 803 days, including 8 EVAs - accumulated during his 5 missions aboard Soyuz, Mir, the Space Shuttle and the International Space Station - a flight career spanning from 1988 to 2005. American astronaut Jeff Hoffman flew five missions aboard four different US Space Shuttle from 1985 thru 1996, including the STS-35 ASTRO-1 astronomy labpratory mission, the STS-61 Hubble Space Telescope repair mission, and the STS-75 US Microgravity payload mission. Jessica Meir is a member of ISU's MSS class of 2000, and was chosen by NASA as an astronaut in 2013. She completed her astronaut candidate training in 2015 and is currently in training for a future ISS crew assignment.

International Space University would like to thank Davis Institute, Hebrew University for partnering with ISU to support Ms. Meir's travel.

Film Night

Saturday, July 23

Hosted by:

Michael Potter, Paradigm Ventures and Producer of "Orphans of Apollo" and "The University"
Chris Stott, ManSat LLC

This film night will screen "Orphans of Apollo" (only the second time it has ever screened in Israel!) and "The University", both produced by Michael Potter, and feature a discussion on "How ISU Positively Impact a Billion People Lives in the Next Decade".

Orphans of Apollo is the extraordinary true story of a rebel group of entrepreneurs who seized command of the Russian Mir Space Station. It was the pioneering efforts of these brave, free marketeer businessmen who launched the New Space Revolution, and kick-started the privatization of outer space as we know it today. This is the greatest story never told, and one film you are not supposed to see. https://www.youtube.com/watch?v=Br0vqXJ39pg.

This first film will be followed by a Question and Answer session that asks "How ISU Will Positively Impact a Billion People Lives in the Next Decade". The evening will conclude with a private focus group screening of the feature documentary film "The University", which explores the world of ISU's sister institution, Singularity University, a new organization supported by Google and NASA that studies the cutting edge of technology, and how we can use it to save the world.

Israel in Space Panel

Sunday, July 24

Moderator:

Deganit Paikowsky, Senior Researcher, Yuval Neeman Workshop for Science, Technology and Security

Panelists:

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 the Asher Space Research Institute, Technion
Ofer Lapid, Space Entrepreneur, SpaceNest
Avishay Gal-Yam, Senior Scientist, Department of Particle Physics and Astrophysics, Weizmann Institute of Science
Nili Mandelblit, Space Domain Coordinator, Israel Europe R&D Directorate

Ever since its early years Israel has been involved in advanced research and development activities in space. With its first scientific research rocket launched in 1961 and its first satellite launched in 1988 (making it the 8th member of the spacefaring nations club). Israel's insistence on maintaining ability to design, build, test and launch its own satellites has led to advanced engineering achievements and a startup mentality with regards to space technologies. These achievements and this mentality goes on as Israel enters the age of New Space and ever growing accessibility to space.

The 'Israel in Space' panel will present all aspects of space in Israel, with representatives from government, academia, industry and startups.

Space Entrepreneurship Panel

Monday, July 25

Moderator: Chris Stott, ManSat LLC
Panelists:

Meidad Pariente, CEO Sky and Space
Daniel Rockberger, Founder of SkyFi
Ofer Lapid, Amazon
Andy Aldrin, Director, Buzz Aldrin Space Institute
Michael Potter, Paradigm Ventures

An evening of insightful 'to and fro' conversation with proven space entrepreneurs who are leading advances in the global space markets with new services, products and technologies and all with deep ISU connections.

Gerald A. Soffen Memorial Lecture - Buzz Aldrin

Tuesday, July 26

Speaker: Buzz Aldrin, ISU Chancellor

Each year, ISU honors 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.

Buzz Aldrin earned his Doctorate of Science in Astronautics at MIT and wrote his thesis on Manned Orbital Rendezvous. He was selected by NASA in 1963 into the third group of astronauts, and earned the nickname "Dr. Rendezvous." The docking and rendezvous techniques he devised are still used today. He also pioneered underwater training techniques, as a substitute for zero gravity flights, to simulate spacewalking.

In 1966 on the Gemini 12 orbital mission, Buzz set an EVA

record for a 5 1⁄2 hour space walk. On July 20, 1969, Buzz and Neil Armstrong made their historic Apollo 11 moon walk, becoming the first two humans to set foot on another world. They spent 21 hours on the lunar surface and returned with 46 pounds of moon rocks. An estimated 600 million people – at that time, the world's largest television audience in history – witnessed this unprecedented heroic endeavor.

Since retiring from NASA, Buzz has remained a proponent of human space exploration. He devised a master plan for missions to Mars known as the "Aldrin Mars Cycler", and has received three US patents for his schematics of a modular space station, Starbooster reusable rockets, and multi-crew modules for space flight. He founded Starcraft Boosters, Inc., a rocket design company, and Buzz Aldrin's ShareSpace Foundation, a nonprofit devoted to addressing science literacy for children by igniting their passion for science, technology, engineering, arts and math (STEAM) through delivering hands-on STEAM activities and inspirational messages.

Dr. Aldrin is an author of nine books including his New York Times best-selling autobiography entitled, "Magnificent Desolation". He continues to inspire today's youth with his illustrated children's books: Reaching for the Moon, Look to the Stars, and recently released Welcome to Mars: Making a Home on the Red Planet. His 2013 book, "Mission to Mars: My Vision for Space Exploration", outlines his plan to get us beyond the moon and on to Mars. As one of the leading space exploration advocates, Buzz continues to chart a course for future space travel and is passionate about inspiring the younger generations of future explorers and innovators.

International Space University would like to thank El Al Airlines for sponsoring the travel of Dr. Aldrin.

Space Education Panel

Thursday, July 28

Moderator:

Donald James, NASA Associate Administrator for Education

Panelists:

Hugo Maree, Head of Education and Knowledge Management Office, ESTEC

Chris Welch, VP, Education and Workforce Development, International Astronautical Federation

Matthew Daniels, NASA Engineer, Advisor to the Director, Office of the Secretary of Defense

An important responsibility of the world's Space Agencies, commercial space companies, and informal STEM-related institutions (e.g. science centers) is to inform, inspire, and engage the public about the latest advances and discoveries in the space sector, and to develop programs that will inspire and help young people pursue careers in science and technology. As we begin the second century of flight however, we must remain committed to excellence in science, technology, engineering and mathematics education and ensure that the next generation of explorers can accept the full measure of their roles and responsibilities in shaping the future. That includes broadening our reach to an even wider cohort of students and going beyond STEM. It's no longer sufficient to have firm boundaries around traditional "STEM" fields for space exploration. Space exploration must engage and appeal to artists and designers, makers and communicators. Students must be interdisciplinary, collaborative, and more "global" to be successful. Education for the future of space exploration can play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will be the leaders and pioneers of tomorrow. This Space Education Panel features experts who each day lead activities to inspire and motivate students to ensure the existence of a qualified workforce and to ensure progress in future space activities..

The Human Side of the Columbia Mission

Sunday, July 31

Rona Ramon, Jonathan Clark, Doug Hamilton, John Connolly

Space shuttle Columbia's STS-107 mission was a milestone for space life science, but the mission's vast accomplishments were overshadowed by the mission's tragic end. Embedded within this mission are may human stories - not only of the crew, but of the thousands of people on Earth whom the mission touched. This exceptional panel brings together four individuals who will share their human stories of Columbia's last mission. Rona Ramon and Jon Clark shared the most personal connection to the mission, their spouses, Israeli Air Force officer Ilan Ramon and NASA astronaut Laurel Clark, were two of the crewmembers lost on the flight. Doug Hamilton was a flight surgeon who worked with the crew and participated in their recovery, and John Connolly led one of the many teams who searched 3000 square kilometers of east Texas to recover the remains of shuttle itself. The human stories of Columbia range from the seven families of the STS-107 crew, to the mission's flight controllers, and support staff, to the 22,000 individuals would take part in the largest search and recovery in spaceflight history. The number of individuals touched by the loss of the seven crewmembers made the Columbia mission a truly human story.

Distinguished Lecture - The Breakthrough Initiative

Tuesday, August 2

Speaker: Simon "Pete" Worden

At the Royal Society in London on July 20, 2015, Yuri Milner, Stephen Hawking and Lord Martin Rees announced a set of initiatives — a scientific programme aimed at finding evidence of technological life beyond Earth entitled 'Breakthrough Listen', and a contest to devise potential messages named 'Breakthrough Message'. In addition, atop the One World

Trade Center in New York on April 20, 2016, 'Breakthrough Starshot' was announced, an interstellar programme to Alpha Centauri. These are the first of several privately-funded global initiatives to answer the fundamental science questions surrounding the origin, extent and nature of life in the universe. The Breakthrough Initiatives are managed by the Breakthrough Prize Foundation.

Arthur C. Clarke Panel: Where Space Meets Popular Culture

Thursday, August 4

Moderator:

Chris Welch, Director of Masters Program, ISU

Panelists:

Chris Riley, Science Writer and Filmmaker

Ana Brzezinska, Filmmaker and Audiovisual Producer

TIm Otto Roth, Artist

Eric Choi, Aerospace Engineer and Science Fiction Writer

ISU's Arthur C. Clarke Panel celebrates the intersection of space and popular culture, in the same way that Arthur Clarke's works popularized space to the general public. From books to Hollywood films, from social media to music, space themes can be found everywhere. This panel invites individuals from all areas of art to share how space has inspired their creations, and how their work may inspire what we may do one day in space, and how STEM may soon be replaced by STEAM (Science,Technology, Engineering, Art and Mathematics). ISU thanks the Arthur C. Clarke Foundation for their ongoing sponsorship of this panel.

Distinguished Lecture - A Nightwatchman's Journey

Monday, August 15

Speaker: David Levy

David Levy is an internationally renowned Canadian astronomer who is celebrating 50 years of searching the sky for comments and asteroids. He is best known for his co-discovery in 1993 of Comet Shoemaker-Levy 9, which collided with the planet Jupiter in 1994. Dr. Levy will be sharing his lecture "A Nightwatchman's Journey", discussing his experiences and observations in astronomy. Dr. Levy has discovered 21 comets, eight of them using his own backyard telescopes. His discovery of Shoemaker-Levy 9, with Eugene and Carolyn Shoemaker at the Palomar Observatory in California, produced the most spectacular explosions ever witnessed in the solar system. Levy is currently involved with the Jarnac Comet Survey, which is based at the Jarnac Observatory in Vail, Arizona but which has telescopes planned for locations around the world.

Other Activities

Robotics Competition

Thursday, July 28

Competition Director: Eric Choi, Canada

The task is simple: build and program a prototype robot that can autonomously navigate a simulated planetary surface and collect samples. Thanks to LEGO Mindstorms, teamwork and a lot of imagination, ISU participants will design and build autonomous robots following the mission requirements of a simulated planetary exploration scenario. The performance of the robots will be evaluated by a group of judges, and prizes will be given to the winning teams. Visitors of all ages are welcome to share an educational and fun experience.

Alumni Conference

August 3 - 6

Coordinator: Joshua Nelson, ISU

The Alumni Conference brings an additional number of space professionals to the SSP to extend personal network and knowledge. During each SSP, ISU alumni and host partners organize an Alumni Conference with reunion events open to all ISU alumni and participants. It is a wonderful occasion to meet and share the experiences with the alumni who have graduated from ISU over the past 28 years. Participants are welcome to join the alumni conference activities including the Career Fair, Poster Session and Space Masquerade.

Rocket Launch

Friday, August 19

Launch Director: John Connolly, ISU/NASA

International Space University conducts an annual rocketry launch competition during Space Studies program. Participants from ISU's Engineering department are divided into international teams of four to design, construct and fly a rocket that will meet a set of difficult requirements for altitude, payload, data capture, and design style. Each team designs a unique rocket from a limited selection of body tubes, nose cones, rocket motors and other components, aided by computer design and simulation programs. Each rocket design passes several safety checks before it is certified to fly in the competition. And, as with any competition, there is only a single winner - Will the rocket attain the correct altitude? Will the fragile payload be returned safely? Will the vehicle fly straight and stable? It is a real-world challenge and the team with the best performance will be recognized for their hard work. This is an event open to the public and visitors of all ages are welcome!

SSP16 Social Media

ISU and Technion will use social media to allow all stakeholders and those interested in the program to follow our activities online. The social media team will actively use online tools such as blogs, Facebook, Twitter, Instagram and Flickr to share information about the program. Through these online channels we will highlight key activities, such as special events, competitions, professional visits and special lectures, and ISU SSP life in general.

All SSP16 social media will use hashtag #SSP16 and where applicable, our social media motto #DreamItLaunchIt. With these hashtags, anyone interested in the program can follow the activities, on any channel. We encourage all staff and participants to use the #SSP16 hashtag and to participate in our social media outreach!

ISU SSP16 website (blog): ssp16.isunet.edu ISU SSP
Twitter: @ISU_SSP
ISU Twitter: @ISUnet
ISU Instagram: @spaceuniversity
ISU Facebook Page: International-Space-University-ISU
ISU SSP Facebook Page: ISU Space Studies Program
ISU Facebook Group: ISU SSP16 (staff and participants only)
ISU Friends on LinkedIn: https://www.linkedin.com/groups/52924
ISU YouTube: www.youtube.com/user/SpaceUniversity

Culture Nights

Most weeks there will be a cultural night, in which participants from different countries will introduce their national background to everyone by offering special dishes, drinks, music, singing, and presentations.

Support and Facilities

SSP English Programs

Space English Access Course

During the week prior to the opening ceremony, an intensive Space English Access Course (SEAC) is offered for participants who want to practice and improve their English communication skills. The SEAC provides 36 hours of individual and group activities focused on speaking, listening, reading, and writing English to prepare the participants for full engagement in all aspects of the SSP. In addition to offering a low-key environment where participants learn and use the vocabulary and Key Concepts of the space-related disciplines, the SEAC includes orientation to the SSP program, schedules, and resources.

The SEAC is developed and facilitated by the English Programs Lead, with the assistance of other teachers who have similar training and experience in Teaching English to Speakers of Other Languages (TESOL), English for Special Purposes (ESP), and/or English for Academic Purposes (EAP).

There is an additional fee for SEAC enrollment. For more information, please contact Nassim Bouvet at admissions@isunet.edu

English Classes

The weekly SSP schedule includes optional English Classes. During these classes, the English Team will be available to help participants having difficulty with understanding and communicating in English.

Help will be provided in the following areas:

- **Weeks 1-4**: Core Lecture vocabulary and Key Concepts; Writing and Presentation Workshops
- **Week 4**: Exam preparation
- **Weeks 5-6**: Departmental Papers/Presentation: Participants who need assistance with their department papers should schedule individual appointments with an English Team member.
- **Weeks 6-8:** Writing and editing support for the Team Projects - Editing Workshop and Executive Summary Workshop.

Each class will be organized and facilitated by the Lead of English Programs, with assistance from staff and faculty. In addition, individual participants - or groups of participants with similar goals - are encouraged to arrange tutorial times with English teachers, who will then post a weekly calendar for any tutorials scheduled outside of the regular English classes.

Team Project (TP) Editing Support

The English Team includes SSP or MSc graduates for on-site assistance. Online assistance is available from ISU Faculty with extensive TP experience, as well as experience in writing and editing documents for educators and professionals in a variety of space-related disciplines. Editing support includes:

- **Week 6**: TP Editing Workshop for TP Editors only, and Workshops for the TP Executive Summary sub- teams.
- **Weeks 6-8:** Online and in-house editing support for each TP; assistance to individuals/groups in preparing for TP Final Presentations.

English Team

- **Carol Carnett** (English Programs Lead)
- **Subhani Shaik** (SEAC Assistant)
- **Merryl Azriel** (Editing Support Team Lead)
- **Laura Rose** (Editing Support Team)
- **Ruth McAvinia** (Editing Support Team)

ISU Online Library

The ISU library contains space related documents and books to support the lectures and the work on Team Projects. With the web service, you will have access to many online resources, such as bibliographic databases, past Team Project reports, online books, electronic journals, and various pdf documents.

http://isulibrary.isunet.edu/

Host site resources: ISU has cooperated with host institute Technion to provide you full access to the vast resource of the Technion libraries. These resources include scientific and technical journals, databases, and specialized materials, most of which are available online. Assistance and support will be available to you in-person on limited basis in the Central library located in the campus center. More info:

http://library.technion.ac.il/en

Accommodation

At the Mizrach Hadash Dormitories, SSP participants will stay in rooms such that:

- everyone has their own bedroom,
- two bathrooms are shared by five people, and
- the rest of the apartment, including kitchen is common space.

Mizrach Hadash Dormitories
Technion city
3200003 Haifa
Israel

Each room comes equipped with a bed, linens, towels, a desk, a chair, two closets, air conditioning, and wifi coverage.

Laundry services

The Mizrach Hadash Domitories have one laundry room on ground floor of Building 453 and 456, which provide pay-as-you-go services.

Housekeeping

A weekly housekeeping service will be provided.

Important Notice

Alcohol consumption is prohibited at the dorms. You are required to comply with the dormitories and campus rules that are published on the website:

http://ssp16.isunet.edu/policies

Visitors

Due to the intensity of the program, participants are strongly discouraged from accepting any visitors (e.g., spouses, significant others, friends, or family).

Please refer to the ISU SSP Visitor's Policy and Procedure document, which is available on the SSP16 website and upon request at ssp.logistics@isunet.edu.

Should you wish to host a visitor, please be advised that you are responsible for arranging their accommodations; and ISU will not be able to provide assistance in booking for your visitors.

Bicycles

Technion campus and Haifa in general are quite hilly. Some electrically assisted bicycles can be rented for people willing to use this kind of transportation.

Parking on Campus

Parking slots are available at or nearby the SSP16 Residence.

Note: If you plan to rent a car for the weekend, you must notify SSP Logistics no later than Thursday 1 p.m. in order to get access at the Technion Gate.

Shipping Address

Shipping address for letters, and for packages are at:

Participant Full Name
Space Studies Program 2016 Mizrach Hadash Domitories
Office Building 458
Technion City
3200003 Haifa, Israel

Meal Plan

The dining facilities used throughout SSP16 are all located on campus. Each participant will receive a sufficient amount of vouchers during the Registration. The meal plan includes (3) three meals per day on working days and (2) two meals per day (brunch, and dinner) on Fridays and Saturdays.

Departure Information

Departure day for all participants is **Friday, 2 September 2016**. All rooms must be vacated by **12:00 noon** that Friday. Accommodation will **not** be available past this date and time.

Important Notice: Participants are responsible for their transportation to the airport.

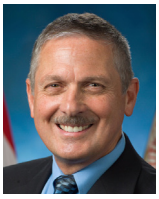
Invited Lecturers and Experts

Zaid Abassi (Israel)
Reut Abramovich (Israel)
Ofir Akunis (Israel)
Andrew Aldrin (USA)
Buzz Aldrin (USA)
David Alexander (USA)
Heather Allaway (Canada)
Douglas Archer (USA)
Philippe Armbruster (France)
Jacques Arnould (France)
Ayelet Baram-Tsabari (Israel)
Yael Barel (Israel)
Melissa Battler (Canada)
David Beatty (USA)
John Beck-Hofmann (USA)
Isaac Ben-Israel (Israel)
Avraham Blasberger (Israel)
Daniel Brack (Israel)
Asaf Brimer (Israel)
Ana Brzezinska (Poland)
Jim Burke (USA)
Carol Carnett (USA)
Eric Choi (Canada)
Ian Christensen (USA)
Clint Clark (USA)
Jonathan Clark (USA)
Philippe Clerc (France)
Gilles Clément (France)
Jacob Cohen (USA)
John Connolly (USA)
Joe Cotti (Israel)
Jeremy Curtis (UK)
Volker Damann (Germany)
Matt Daniels (USA)
Juan de Dalmau (Spain/Germany)
David Degani (Israel)
Ana Diaz Artiles (Spain)
Opher Doron (Israel)
Kerrie Dougherty (Australia)
Stacey Falzarano (USA)
Michele Faragalli (Canada)
Barak Fishbain (Israel)
Michael Flynn (USA)
Norbert Frischauf (Austria)
Avishay Gal-Yam (Israel)
Maya Glickman-Pariente (Israel)
Daniel Glover (USA)
Maya Golan (Israel)
Thomas Goodman (Israel)
Jeff Gossel (USA)
Daniel Green (USA)
Vincent Guillaud (France)
Francesc Guim (Spain)
Daniel Gurfl (Israel)
Pini Gurfil (Israel)
Vera Gutman (Israel)
Douglas Hamilton (Canada)
Amnon Harari (Israel)
Michael Hecht (USA)
Michael Hesse (USA)
Jeffrey Hoffman (USA)
John Hogan (USA)
Barbara Imhoff (Austria)
Adil Jafry (USA)
Donald James (USA)
Michal Jashinski (Israel)
Rüdiger Jehn (Germany)
Christopher Johnson (USA)
Joan Johnson-Freese (USA)
Jeff Jones (USA)
Ramin Khadem (Canada)
Nimrod Kozlovski (Israel)
Sergei Krikalev (Russia)
Violetta Kuvaeva (Russia)
Ofer Lapid (Israel)
Rene Laufer (Germany)

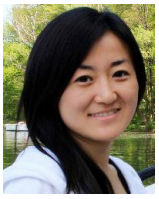
Kris Lehnhardt (Canada)
David Levy (USA)
Ari Lipsky (Israel)
John Logsdon (USA)
Shimrit Maman (Israel)
Jeffrey Manber (USA)
Nili Mandelblit (Israel)
Pier Giorgio Marchetti (Italy)
Hugo Maree (Netherlands)
Mikhail Marov (Russia)
Gary Martin (USA)
Tanja Masson-Zwaan (Netherlands)
Ruth McAvinia (Ireland)
Chris McKay (USA)
Jessica Meir (USA)
Hagit Messer-Yaron (Israel)
Romi Mikulinsky (Israel)
Michael Mineiro (USA)
Steve Mirmina (USA)
Harvin Moore (USA)
Janet Moore (USA)
Michaela Musilova (Canada)
Roy Naor (Israel)
Emily Nelson (USA)
Joshua Nelson (USA)
Paolo Nespoli (Italy)
Jennifer Ngo-Anh (Germany)
Josh Richards (Australia)
Tim Otto Roth (Germany)
Deganit Paikowsky (Israel)
Meidad Pariente (Israel)
Chirag Parikh (USA)
Norah Patten (Ireland)
Bernardo Patti (Italy)
Walter Peeters (Belgium)
Sarah-Jane Pell (Australia)
Joseph Pellegrino (USA)
Joseph Pelton (USA)
Lavie Peretz (Israel)
Gilad Peternaker (Israel)
Vladimir Pletser (Belgium)
Ilan Porat (Israel)
Danielle Potchter (Israel)
Michael Potter (USA)
Richard Quinn (USA)
Rona Ramon (Israel)
Ewan Reid (Canada)
Bob Richards (USA)
Chris Riley (UK)
Daniel Rockberger (UK)
Oshri Rozenheck (Israel)
Mike Safyan (USA)
Christian Sallaberger (Canada)
Rob Scheige (USA)
Randy Segal (USA)
Keren Shahar (Israel)
Niamh Shaw (Ireland)
Michael Simpson (USA)
François Spiero (France)
Wim Steenbakkers (Netherlands)
Geoff Steeves (Canada)
Lucy Stojak (Canada)
Christopher Stott (USA)
Nicole Stott (USA)
Michael Suffredini (USA)
Su-Yin Tan (Canada/Papua New Guinea)
Remco Timmermans (The Netherlands)
Erin Tranfield (Canada)
Diego Urbina (Italy/ Colombia)
Peter Visscher (Canada)
Ayelet Weizman (Israel)
Chris Welch (UK)
Ray Wheeler (USA)
Charles Whetsel (USA)
Loretta Whitesides (USA)
Yonathan Winetraub (Israel)
Nathan Wong (USA)
Simon Worden (USA)
Yahav Yona (Israel)

SSP16 Staff

ISU SSP Core Team



John Connolly
ISU - SSP Director
USA



Zhuoyan Lu
ISU - SSP Academic Coordinator
China

Sebastien Bessat
ISU - SSP Logistics Coordinator
France

Rob Hunt
SSP On-Site Academic Coordinator
Australia

Didier Guillaume
ISU - SSP Logistics Support
France

Academic Support Team

Jim Burke
Senior Academic Advisor
USA

Carol Carnett
English Program Lead
USA

Subhani Shaik
English Program Assistant

Noémie Bernede
Academic Assistant
France/ Germany

Muriel Riester
ISU - Librarian
France

Merryl Azriel
TP Editor
USA

Ruth McAvinia
TP Editor
Ireland

Laura Rose
TP Editor
Canada

Operation Team

Shrrirup Nambiar
SSP Logistics Support
India

Göktuğ Karacalıoğlu
Participant Liaison
Turkey

Maria Lucas Rhimbassen
SSP Accountancy and Librarian
Canada

External Relations Team

Geraldine Moser
ISU - Business Development Manager
France

Vera Gutman
External Relations Support
Israel

Jonathan Faull
External Relations Support
Ireland

IT Team

Nicolas Moncussi
ISU - SSP IT Lead
France

Bernd Weiss
SSP IT Support
Germany

Benjamin Gürtl
SSP IT Support
Austria

Audio-Visual Team

Colin Keen Lussier
Audio-Visual Support
Canada

Other ISU Central Campus Staff

In addition to the SSP staff listed, the following personnel work at the ISU Central Campus in Strasbourg, France (as of May 2016) also contribute their great efforts to SSP16.

Nassim Bovet
Head of Admissions and Alumni Affairs
Steve Brody
Vice President of North American Operations
Laurence Heiser
Accountant
Joël Herrmann
Manager of IT Services
Christine Jenck
Assistant, Reception, Travel, and Conference Services
Päivi Mcintosh
MSS Student Affairs & Communicaiton Lead
Sylvie Mellinger
Director of Administration and Finance
Joshua Nelson
SHEE Project Engineer and Technical Facility Supervisor
Cécile Paradon
Manager of Human Resources
Walter Peeters
President
Nadia Repussard
MSS Program Planning and Coordination Lead
Marie Wack
Coordinator of Web and Social Media
Chris Welch
Director of Master's Program

Local Organizing Committee Core Team

As our host institution, Technion makes great contributions to SSP16. Special thanks to the excellent team of the Local Organizing Committee (LOC).

Prof. Boaz Golany
Technion Vice president for external relations and resource development
Matanyahu Englman
Technion Director General
Zehava Laniado
Technion Deputy Director of operations
Pini Gurfil
Chair of Local Organizing Committee, Director of Asher Space Research Institute
Neta Vizel
Director of Local Organizing Committee
Shirley Ginesin
LOC Operations Coordinator
Daniel Brack
LOC Academic Coordinator
Ira Rashkovan
LOC Logistics Coordinator
Laurie Goldstein
LOC Logistics Coordinator
Zeev Schneider and Shay Oldak
Computer and Information Systems Department
Gil Lainer and Doron Shaham Marcus
Technion Spokesmen
Yvette Gershon and Barbara Frank
Technion Public Relations
Nili Naor
Technion Dorms
Gil Keren
Technion Purchasing
Sterntal Galit and Liri Derman
Budget Division
Lee Nudel
Asher Space Research Institute Administrator

Schedule

Please always refer to the up-to-date schedule at:

https://ssp16.isunet.edu/academics/calendar/

Or,

Scan the following QR-code:

July 3 to July 9, 2016

Week 27

July 2016						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

August 2016						
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28	29	30	31			

SSP16-Logistics
SSP16-Activities

	3 Sunday	4 Monday	5 Tuesday	6 Wednesday	7 Thursday	8 Friday	9 Saturday
	Week 0						
7 AM							
8 AM	Breakfast Fordmeisner Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordmeisner Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordmeisner Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordmeisner Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordmeisner Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast	
9 AM		SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	
10 AM							
11 AM							Brunch
Noon							
1 PM	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	
2 PM		SEAC Student Union building, 2nd floor; TA roles, responsibilities, and expectations	SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	SEAC Student Union building, 2nd floor	
3 PM							
4 PM							
5 PM							
6 PM	SEAC Registration Gimmi TBD Shell Israel, Marsch Chadash, Technion bit the; Dinner		Dinner	Dinner	Dinner	Dinner	Dinner
7 PM							
8 PM							
9 PM							
10 PM							
11 PM							

July 10 to July 16, 2016

Week 28

July 2016						
S	M	T	W	T	F	S
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31						

August 2016						
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21	22	23	24	25	26	27
28	29	30	31			

SSP16-Logistics
SSP16-Activities

	10 Sunday	11 Monday	12 Tuesday	13 Wednesday	14 Thursday	15 Friday	16 Saturday
	Week 1						
7 AM							
8 AM	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel		Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordsheimer Faculty Center & Guest House, Technion City,		
9 AM	Registration Shell Israel Club, Marach Chadash, H3 on Technion map		SSP16 Program Introduction Core Lecture Hall @ National Building Research Institute (NBRI, D2 on Technion map)	L01 – Core Lecture Series Overview (Tan/Welch) Core Lecture Hall @ National Building	Core Lecture tutorial L05 – The Space Environment (Hoffman)		
10 AM				L02 – Origins of the Space Age (Hoffman) Core Lecture Hall @ National Building	L06 – Orbital Mechanics (Welch)		
11 AM		Welcome Brunch, Host and Staff Introduction, SSAC ceremony Transparent Hall, Student Union Building, Technion				Brunch	Brunch
Noon				L03 – Legal Foundations of International Space Activities (Shabad) Core Lecture Hall @ National Building	L07 – Policy Rationales for Space Activities (Logsdon)	Core Lecture tutorial	
1 PM	Lunch	City tour	Lunch	Lunch	Lunch	L08 – Orbits and Applications (Welch)	
2 PM			Beauty time	L04 – The Context of Commercial Space (Gelberger) Core Lecture Hall @ National Building	L09 – Business Planning and Management of Space Projects (Gelberger)	L10 – Introduction to Satellite Applications (Tan)	
3 PM		Campus Orientation					
4 PM			Transfer to Class Picture location	Participant Debate Core Lecture Hall @ National Building Research Institute (NBRI, D2 on Technion map)	TP Introduction Core Lecture Hall	L11 – Economic Rationales and Costing of Space Programs (Peterka)	
5 PM			Class Picture Louis Promenade, Haifa, Israel	Business Proposal Competition Intro		L12 – From Competition to Cooperation in Space (Logsdon)	
6 PM	Welcome dinner and Staff introduction Transparent room, Student Union H3 on Technion map	Dinner / Late Registration	Transfer to Rappaport Hall	Dinner	Dinner	Dinner	Dinner
7 PM			Opening Ceremony and Reception - Rappaport Hall Rappaport Hall, Haifa				
8 PM				Distinguished Lecture Hubble Space Telescope – Jeff Hoffman Churchill Auditorium, Technion City, Haifa, Israel	International Awareness and Sensitivity – Margo Paz Core Lecture Hall @ National Building Research Institute (NBRI, D2 on Technion map)		
9 PM							
10 PM							
11 PM							

July 17 to July 23, 2016

Week 29

July 2016						
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31						

August 2016						
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28	29	30	31			

SSP16–Logistics
SSP16–Activities

	17 Sunday	18 Monday	19 Tuesday	20 Wednesday	21 Thursday	22 Friday	23 Saturday
	Week 2						
7 AM							
8 AM	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City,	Breakfast Porchheimer Faculty Center & Guest House, Technion City,	Breakfast Porchheimer Faculty Center & Guest House, Technion City,	Breakfast Porchheimer Faculty Center & Guest House, Technion City,		
9 AM	L13 – Microgravity (Williams)	Core Tutorial <optional> L17 – The Sun and Space Weather (Mitchell)	L21 – Space Propulsion and Launch Vehicles (Mitchell)	L25 – Space Systems Engineering and Mission Design (Connolly)	L29 – Human Adaptation and Countermeasures (Trappalard)	SpaceUP ISU–Haifa. <optional> Department of Aerospace Engineering Technion – Israel Institute of Technology	
10 AM	L14 – Introduction to Space Humanities (Dougherty)	L18 – International Space Station Research (Simpson)	L22 – Marketing, Technology Transfer and Controls (Bigelow)	L26 – National Implementation of Space Law (Bigelow)	L30 – Space Habitability Design (Connolly)		
11 AM	L15 – Introduction to Remote Sensing (Tao)	L19 – What Has Space Brought Us? (Stein)	L23 – International Space Business (Stetson)	L27 – Introduction to Human Performance in Space (Trappalard)	L31 – Current and Future Space Remote Sensing (Tao)	Brunch	Brunch
Noon	Lunch	Lunch	Lunch	Lunch	Lunch		
1 PM						Department & IMS Choice Day	
2 PM	L16 – Digital Image Processing (Tao)	L20 – Financial Issues and Techniques of Space Projects (Stetson)	L24 – Cultural Rationales for Space Activities (Dougherty)	L28 – Space Art and Culture (Dougherty)	L32 – Space Futures (Dougherty)		
3 PM							
4 PM	Fundamental Workshop TF Classrooms	Fundamental Workshop TF Classrooms	Fundamental Workshop TF Classrooms	Health Training and Crisis Communication	Departments Introduction (Department TA's and Chairs) Core Lecture Hall		
5 PM							
6 PM	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner
7 PM							
8 PM	Distinguished Lecture John Kennedy, Richard Nixon, and the American Space Program – John Logsdon Churchill Auditorium, Technion city,	International Astronaut Panel Churchill Auditorium, Technion city, Haifa, Israel	Breaking Bent Churchill Auditorium, Technion city, Haifa, Israel	Culture Night 1 Transparent room, Student Union (34 on Technion map)	Bending Bent Churchill Auditorium, Technion city, Haifa, Israel		Movie Night with Michael Potter
9 PM							
10 PM							
11 PM							

July 24 to July 30, 2016

Week 30

SSP16-Logistics
SSP16-Activities

July 2016						
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31						

August 2016						
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21	22	23	24	25	26	27
28	29	30	31			

	24 Sunday	25 Monday	26 Tuesday	27 Wednesday	28 Thursday	29 Friday	30 Saturday
	Week 3						
7 AM							
8 AM	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City,	Core Tutorial <optional>	Breakfast Porchheimer Faculty Center & Guest House, Technion City,	Core Tutorial <optional>	Breakfast Porchheimer Faculty Center & Guest House, Technion City,	Core Tutorial <optional>	Space Startup Weekend	Space Startup Weekend
9 AM	Midterm Disciplinary Quiz Core Lecture Hall	L36 – Space Based Positioning, Navigation and Timing (Tan)	L40 – Current and Future Trends in Global Navigation Satellite Systems (Tan)	L14 – Environmental Control and Life Systems (Cannan)	L48 – Space Operations (Bishop)
10 AM	L33 – Becoming a Space Entrepreneur (Smith)	L37 – Space Robotics (Zacl)	L41 – Spacecraft Systems 2 (Choi)	L43 – The Solar System, the Moon and Mars (Marvel)	L49 – Exoplanets and New Developments (Marcy)
11 AM	L34 – Spacecraft Subsystems 1 (Welch)	L38 – Life Cycle of the Stars (Welch)	L42 – Space Situational Awareness and Space Debris Mitigation (Sahr)	L45 – Space, Society, Communication and Outreach (De Dumont)	L50 – Geopolitics and Major Space Powers (Johnson-Freese)	Brunch	Brunch
Noon	Lunch	Lunch	Lunch	Lunch	Lunch
1 PM					
2 PM	L35 – Space Physiology and Medicine 1 (Cannan)	L39 – Astrobiology (Abramovich)	L43 – Space Physiology and Medicine 2 (Cannan)	L47 – New Space: The Emerging Commercial Space Industry (Martin)	L51 – Design Thinking and New Business Models (Martin)
3 PM	TP 1	TP 2 – Expert Day	Workshop 1	Workshop 2	Robotics Competition Mechanical Eng. Bld. Atrium
4 PM					
5 PM	Dinner	Dinner			Dinner	Dinner	Dinner
6 PM			Dinner	Dinner	
7 PM	Israel in Space Panel Churchill Auditorium, Technion city, Haifa, Israel	Space Entrepreneur Panel Churchill Auditorium, Technion city, Haifa, Israel	Sofaer Memorial Lecture – Dr. Benz Aldrin Churchill Auditorium, Technion city, Haifa, Israel	Culture Night 2 (Transport room, Student Union 04 on Technion map)	Space Education Panel (tentative)
8 PM	
9 PM	
10 PM	
11 PM	

Eastern European Time Time Zone

July 31 to August 6, 2016

Week 31

July 2016						
S	M	T	W	T	F	S
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31						

August 2016						
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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

SSP16-Logistics
SSP16-Activities

	31 Sunday	1 Monday	2 Tuesday	3 Wednesday	4 Thursday	5 Friday	6 Saturday
	Week 4			Alumni Weekend			
7 AM							
8 AM	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Core Tutorial <optional>	Breakfast Porchheimer Faculty Center & Guest House, Core Tutorial <optional>	Breakfast Porchheimer Faculty Center & Guest House, Core Tutorial <optional>	Breakfast Porchheimer Faculty Center & Guest House, Core Tutorial <optional>	Space StartUp Pitch Competition <optional> Technion Student Union building movie theatre	Alumni Football Match Kiryat Shmuel stadium – address TBC
9 AM	L52 – Space and the Earth (Tan)	L56 – Commercial Satellite Communications Industry (Eleven)	Core Lecture Exam (Disciplinary Calls + Interdisciplinary Essay)	TF 4	DA 4		
10 AM	L53 – Satellite Telecommunications (Eleven)	L57 – Medicine in Space (Hamilton)					
11 AM	L54 – New and Emerging Space Players (Johnson-Freese)	L58 – Cosmology: Origin and Fate of the Universe (Muron)				Brunch	Brunch
Noon	Lunch	Lunch	Lunch	Lunch	Lunch		
2 PM	L55 – Space Psychology (Hamilton)	L59 – Core Lecture Series Wrap-Up (Tan/Mielck)	DA 2	DA 3	DA 5		
3 PM	DA 1	TF 3					
4 PM							
5 PM	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner
6 PM		Study Time					
7 PM	Columbia Panel Churchill Auditorium, Technion city, Haifa, Israel		Breaking Bent Churchill Auditorium, Technion city, Haifa, Israel	Culture night 3 Transparent room, Student Union (34 on Technion map)	Arthur C. Clarke Panel Churchill Auditorium, Technion city, Haifa, Israel	Space Masquerade Ball Transparent Hall, Student Union building	
8 PM							
9 PM							
10 PM							
11 PM							
12 AM							

August 7 to August 13, 2016

Week 32

August 2016						
S	M	T	W	T	F	S
	1	2	3	4	5	6
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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2016						
S	M	T	W	T	F	S
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

SSP16-Logistics
SSP16-Activities

	7 Sunday	8 Monday	9 Tuesday	10 Wednesday	11 Thursday	12 Friday	13 Saturday
	Week 5				Jerusalem+Masada+Perseids Observation		
12 AM						Israel Culture tour + Meteor Shower Viewing	
1 AM							
2 AM							
3 AM							
4 AM							
5 AM							
6 AM							
7 AM							
8 AM	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel		
9 AM	TF 5	TF 6	TF 7	DA 8	Israel Culture tour + Meteor Shower Viewing		
10 AM							
11 AM						Brunch	Brunch
Noon			Team Project Plan Due				
1 PM	Lunch	Lunch	Lunch	Lunch	Lunch		
2 PM	DA 5	DA 7	DA 6	DA 10			
3 PM							
4 PM							
5 PM							
6 PM	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner
7 PM	Participant Talk						
8 PM		Cultural night 4 Transparent Hall, Student Union 6H on Technion map	Cultural Departmental Activities	Cultural Departmental Activities			
9 PM							
10 PM							
11 PM							
12 AM							

Eastern European Time Time Zone

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August 14 to August 20, 2016

Week 33

August 2016						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2016						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

SSP16-Logistics
SSP16-Activities

	14 Sunday	15 Monday	16 Tuesday	17 Wednesday	18 Thursday	19 Friday	20 Saturday
	Week 6						
7 AM						Transfer to the Model Rocket Launch via Minivan	
8 AM	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordsheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Model Rocket Launch, and Kibbutz visit	
9 AM	TF 8	GA 22	GA 23	TF 10	TF 12		
10 AM						Brunch at Kibbutz	
11 AM							Brunch
Noon							
1 PM	Lunch	Lunch	Lunch	Lunch	Lunch		
2 PM	GA 11	TF 9	WS 9	TF 11	TF 13		
3 PM							
4 PM					TF Editing Workshop		
5 PM		TF Executive Summary Workshop 1		TF Executive Summary Workshop 2			
6 PM	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner
7 PM	Participant Talk						
8 PM		Distinguished Lecture - David Levy "A Nightmatchmaker's Journey"		Culture Night 3 Transparent Hall, Student Union (Bldg. on Technion map)			
9 PM							
10 PM							
11 PM							

August 21 to August 27, 2016

Week 34

August 2016						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2016						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

SSP16-Logistics
SSP16-Activities

	21 Sunday	22 Monday	23 Tuesday	24 Wednesday	25 Thursday	26 Friday	27 Saturday
	Week 7						
7 AM							
8 AM	Breakfast Fordinheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordinheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordinheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordinheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Fordinheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast	
9 AM	TF Time	TF time	TF time	TF time	TF time	TF time	
10 AM							
11 AM							Brunch
Noon							
1 PM	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	
2 PM	TF Time	TF time	TF time	TF time	TF time	TF time	
3 PM							
4 PM							
5 PM				Draft of Executive Summary and			
6 PM	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner	Dinner
7 PM	Participant Talk						
8 PM						Talent Night Transparent Hall, Student Union Building, Technion	
9 PM							
10 PM							
11 PM							

Eastern European Time Time Zone

August 28 to September 3, 2016

Week 35

August 2016						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2016						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

SSP16-Logistics
SSP16-Activities

	28 Sunday	29 Monday	30 Tuesday	31 Wednesday	1 Thursday	2 Friday	3 Saturday
	Week 8						
7 AM							
8 AM	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel	Breakfast Porchheimer Faculty Center & Guest House, Technion City, Haifa, Israel			
9 AM	TF Rise Executive Sem-	TF Own	TF Final Presentation Rehearsal TAUBE, Computer Science Building, Technion City, Haifa, Israel	Team Project Presentation #1 TAUBE, Computer Science Building, Technion City, Haifa, Israel		Participant Departure Day (before noon)	
10 AM				Team Project Presentation #2 TAUBE, Computer Science Building, Technion City, Haifa, Israel			
11 AM					Introduction to advanced studies		
Noon					Farewell Brunch Transparent Hall		
1 PM	Lunch	Lunch	Lunch	Team Project Presentation #3 TAUBE, Computer Science Building, Technion City, Haifa, Israel			
2 PM				Lunch			
3 PM	TF Rise	TF Own	TF Own				
4 PM							
5 PM				Feedback session with ISU President (Closed to President and Partici-pants only)		Last train before Shabbat (Haifa-TLV) Hu'ts Hof Ha'Carmel (Haifa), Israel	
6 PM		TF Final Report Print Deadline			Closing Ceremony and Reception Rabin Hall, Civil Engineering building, Technion		
7 PM	Dinner	Dinner	Dinner	Faculty feedback to TF teams TAUBE, Computer Science Building, Technion City, Haifa, Israel			
8 PM	Participant Talk			Dinner			
9 PM							
10 PM							
11 PM							