International Space University
Space Studies Program 2020

CALL FOR CHAIRS

22 June – 21 August 2020

Shenzhen University, Shenzhen, China

Response Deadline: 2 August 2019

This is the call for SSP20 Chairs. To serve as a Core, Department, or Team Project Chair an individual is required to be an adjunct, associate or full member of the ISU Faculty - *or*- have sufficient ISU MSS, SSP or SHSSP teaching experience as a visiting lecturer. You should respond to this call only if you can *commit* to being on site for the full duration of the specific time periods indicated in the commitment descriptions below.

Individuals recommended by the SSP Director, endorsed by the ISU Academic Council, and appointed by the ISU President are *required* to attend the Curriculum Planning Meeting (CPM), December 2 to December 6, 2019, at the host site.

Chairs will be provided with a budget to support their departments, team projects, and workshop development. Travel expenses to the CPM and SSP are covered by ISU commensurate with the ISU Compensation Policy.

The SSP is formatted in three interrelated phases

- Phase I (Core): Weeks 1-4 that include core lectures, workshops, departmental activities, and initial team project work
- Phase II (Department): Weeks 4-6 that include core lecture wrap-up, departmental activities, workshops, departmental visits, individual project work, and team project work
- Phase III (Team Project): Weeks 6-9 focused solely on team projects completion.

Description of the Commitment

Core Chair:

SSP service dates: ***Tuesday, 23 June*** *through* ***Friday, 17 July 2020 (Phase I/II)***

We are seeking individuals to serve as Core Chairs for a period of four (4) weeks. Preference will be given to an experienced ISU faculty member familiar with the SSP, SHSSP or MSS lecture series.

The Core Chair's major responsibility is to oversee the delivery of core lectures, including the recommendation of core lecture faculty to the SSP Director, contact with chosen lecturers to provide timely updates of lectures, review of submitted core lecture content (including adherence to the core lecture guidelines and 3-I philosophy), and identification of redundancies across lectures. The Core Chairs also co-lead the Exam Review Committee and lead the effort to create lecture exams and quizzes.

Department Chairs:

SSP service dates: ***Monday, 13 July*** *through* ***Friday, 31 July 2020 (Phase II)***

We are seeking seven (7) individuals to chair the SSP departments. The departments include Space Humanities (HUM), Space Management and Business (MGB), Space Engineering (ENG), Human Performance in Space (HPS), Space Sciences (SCI), Space Policy, Economics, & Law (PEL), and Space Applications (APP).

The Departmental Chairs' major responsibility is to plan and execute the Departmental Activities in Phase II of the SSP, including the selection of Departmental Activities and Visiting Lecturers, selection of Professional Visits, and assignment and evaluation of Individual Projects.

The Department Chairs will participate in the final week of the core lectures and assist as needed with scoring the exam. Department Chairs will also work with their Teaching Associate (TA) to coordinate the execution of the departmental activities. Department Chairs will review the Departmental TA applications and provide the SSP management team with their selection before the established deadline.

Team Project Chairs:

SSP service dates: ***Monday, 3 August*** *through* ***Friday, 21 August 2020 (Phase III)***

TP Chairs are requested to be available via audio or video conference for up to 10 Team Project sessions scheduled between Monday 22th of June and their arrival at the SSP.

For SSP20, ISU Academic Council has selected four team projects (see appendix). We are seeking four (4) individuals to serve as Team Project Chairs.

The TP Chairs are responsible for directing the team projects throughout the nine-week program. Working primarily with the TP TAs, the TP Chairs provide the guidance required for the successful execution of the projects. This will entail developing a plan for the entire session, taking into account that the Chair is not likely to be on site until the final three weeks of the program.

A significant amount of coordination with the TA is required. TP Chairs will review the TP TA applications and provide the ISU academic team with their selection before the established deadline.

How to Respond to this Call

Responses to SSP20 Calls will be accepted through **ISU Involve Platform** ONLY.

- If you have not already done so, you will need to create an account **on ISU Involve Platform** (involve.isunet.edu) using your preferred e-mail address and password.
- Complete the online form providing all requested information.

If you have any questions, contact us via e-mail: sspacademics@isunet.edu

Important Dates

- Response to Call for Chairs due: **Friday, 2 August 2019**
- Academic Council endorsement by: **16 August 2019**
- Acceptance Notification: **NLT 23 August 2019**
- Visa application to attend CPM at Shenzhen, China: **NLT 15 October 2019**
- Submission of Planning Status Report by the Chairs: **1 November 2019**
- Curriculum Planning Meeting: **2nd-6th December 2019 in Shenzhen, China**

You will be notified if you are not selected. These notifications will be sent by 30th of August 2019.

APPENDIX – SSP20 TEAM PROJECTS

The Team Projects for SSP20 that were selected and approved by the Academic Council are described below.

TP #1 – On-Orbit Mobility and Manipulation

Controllable on-board propulsion is essential for trajectory correction, orbit insertion, station keeping, rendezvous and other satellite and deep-space purposes. For many years, people have been concerned over its use in anti-satellite weapon systems. Today this concern has become more important because society is increasingly dependent upon the plethora of vulnerable space services. Proposals for new international agreements to ward off a space arms race are circulating, but most experts are pessimistic, at least in the near term. As well, established technologies now permit the creation of spacecraft that can rendezvous with existing spacecraft and repair, refurbish or (in LEO at least) deorbit them. This development further increases the concern that such spacecraft might be used for nefarious purposes. The goals of this team project are to assess the present situation and document practical ways for the world to continue to enjoy the benefits of maneuvering technology (including new uses such as debris removal, clean-up, and planetary defense) as well as to examine servicing opportunities brought about with the development of robotic technologies for in-orbit servicing while reducing the chance of these technologies being misused. In addition, the project will define the technical and management character of a complete ground-based and space operations system consisting of multi-purpose buses and special-purpose payload assemblies for servicing a variety of ongoing missions.

All of the required technologies for both peaceful and space-war maneuvering have been demonstrated, including interception and destruction of satellites. In view of the acknowledged obstacles to a prompt resolution of the problem of military space aggression, an independent, interdisciplinary analysis could prove useful as a contribution to multinational discussions and bilateral agreements. The venues for these discussions and agreements are already in place at the UN, EU and other international policy centers. New methods for conflict resolution are being applied; e.g., by the Western Justice Center. Of equal importance is the history of the Hubble Space Telescope, which shows the potential value of on-orbit repair and refurbishment. In addition, there is a growing need for means to change the orbits (including deorbiting from LEO) of retired space objects to reduce orbital congestion and collision hazards. Human flight for these purposes was shown to be effective in the Shuttle era, but now robotic execution should be considered as a practical alternative.

Given the variety of needs, robotic interceptor spacecraft should consist of common buses and unique servicing payloads. The buses for such spacecraft should exploit

high-powered electric propulsion to enable visiting multiple and varied targets, particularly given that current missions (e.g., Dawn) have shown the potential of using electric propulsion for visiting multiple targets and operating in varied orbits, capabilities now available for servicing. Orbital congestion is a rising hazard. Servicing provides the prospect of both scheduled mission extension and mission salvage after on-board failure. The report from this TP should address not only problems associated with controllable satellite mobility and manipulation, but also potential opportunities, for example, those presented by the planned development of high-powered electric propulsion plus nonaggressive uses of repurposed military space assets. The problem and its solutions are intrinsically international. No solution can be accepted without multicultural public support.

Main Issues to be addressed:

- Movement in several nations toward renewed development of anti-satellite weapon systems.
- Lack of understanding of the potential of new maneuvering techniques.
- Absence of public appreciation of these potential problems and support for innovative solutions.
- Limits of knowledge about servicing opportunities in the world's existing space fleets.
- Lack of practical designs for interceptor robotic spacecraft and operations.
- Absence of workable program plans for international multi-purpose servicing projects.

TP #2 - International Cooperation on the Use of the China Space Station

The Chinese space station is scheduled to be completed and put into operation around 2022. The Permanent Mission of China to the United Nations and other international organizations in Vienna and the United Nations Department for Outer Space Affairs jointly issued a bulletin on opportunities for international cooperation on the Chinese Space Station, inviting countries and institutions from all over the world to cooperate in space science experiments on the Chinese Space Station. According to the Announcement of Opportunities for International Cooperation on the Use of the Chinese Space Station, the Chinese Space Station is open to all countries, organizations and private entities, providing scientists around the world with the opportunity to conduct space science experiments on the Chinese Space Station. This is not only a new attempt for China, but also the beginning of a new era of international space cooperation for countries, organizations and individuals all over the world.

Main issues to be addressed:

- On board experimental projects design and conduct
- International Astronaut Selection and Training
- Relations with the existing International Space Station
- Innovative project design
- Design and organization of Science Popularization Activities and other cultural programs.
- Reserve and communication mechanisms in policy areas such as definition of intellectual property rights, cultural integration and international space law.

TP #3 - The Space Medical Centre

Many medical questions are still opened when planning crewed missions in outer space, especially beyond Low-Earth-Orbit. Long-term human body adaptation might lead to severe medical conditions with the potential of a dramatic impact on the mission success. In addition, there is a risk of unseen medical conditions as the humans would be exposed to extra-planetary environments for the first time. The use of advanced technology and autonomous systems can help but it, up to now, is not comprehensive yet. Then, re-entry is always a rule, not feasible for missions beyond LEO.

There is a need of a more immediate solution, as a framework that would facilitate the management of health in space and that be accessible to a larger number of people: the Space Medical Centre (SMC).

This is a platform to be built in space by scratch or by using already existing space objects. The SMC is: (i) a clinic, (ii) an emergency centre, (iii) a rehabilitation centre and (iv) a training centre. This platform could be located anyway, and could include movable parts that would travel in space in the proximity of the medical emergency. The SMC is used by astronauts and tourists. Moreover, considering the importance of clinical and translational medicine, the SMC guests researchers, participants of human studies, and people seeking for a new treatment of terrestrial disease. In the end, the SMC is a reference platform to be used by medical insurances for medical coverage of astronauts and tourists.

To allow the SMC to exist, a business model needs to be established facing legal challenges that have to account of medical assistance in outer space. Then, as the platform can be composed by movable parts and can have twin stations, placed between destinations, the use of resources shall be addressed as the SMC shall be almost independent from natural terrestrial resources. What is the impact of the SMC on the incoming crewed missions? What is its impact on terrestrial medicine (in terms of health, business and research)?

Main issues to be addressed:

Up to now, there is no space medical insurance both for astronauts and space tourists so the monetary evaluation of medical conditions is opened. The legal challenges of providing medical assistance in space, and the safety, ethics and contamination are still opened. In particular, the case of combined terrestrial and space treatments includes considerable legal and medical opened challenges.

TP #4 – Intercontinental Sub-Orbital Commercial Liner

From the space shuttle in 1980s to commercial suborbital/orbital travel in recent years, rapid intercontinental passenger/cargo transportation using aerospace technology will likely be commercialized. This concept could be based on a kind of fully re-used rocket-boost sub-orbital passenger/cargo vehicle (or any other technical approach), which vertically launch at the launch site in/near the airport, with a vertical landing rocket booster and a sub-orbital manned vehicle horizontally landing at the target airport. It could achieve safe and convenient two-hour intercontinental passenger/cargo transportation for the business elites and the general public.

The use of reusable space transportation technology to build a fast and convenient intercontinental passenger/cargo flight has great commercial value in the future, and its related technical, commercial and legal issues are worthy of investigation.

Main issues to be addressed:

- An overview of the technical route of the intercontinental sub-orbital commercial flights
- Intercontinental sub-orbital commercial flight technologies
- Management organization definition
- Business plan and financing plan proposal
- International legal issues and main provisions involved in this project