



FALL 2022 STUDENT GUIDE

Code of Practice, Conduct, and Ethics

Revised: 22 August 2022

Contents

Mission Statement 4

Core Values 4

Our Educational Philosophy..... 4

IIAS Research Programs 6

IIAS Outreach Programs 7

Academic and Philanthropic Character 8

Talking Points 8

Description of Partnerships and Administration 9

Administrative Policies and Procedures 10

Press Policy..... 11

Publishing: Authorship and Acknowledgements 12

IIAS Acknowledgements Boilerplate 14

IIAS Intellectual Property 14

Trustworthiness and Ethics..... 14

Spin-offs, Deployment, and Impact 15

Diversity, Equity, and Inclusion of Under-represented Groups..... 15

Data Transparency 15

IIAS Academic Honesty & Plagiarism Policy 18

IIAS Code of Business Conduct and Ethics 18

Statutes 19

Integrity..... 19

Responsibility 21

Safe, Secure, and Healthy Environment 22

References 23



Dear IIAS Candidate,

On behalf of our institute, I would like to welcome you to the International Institute for Astronautical Sciences. This is an exciting time for everyone involved with IIAS, and your class marks a first step towards a great new era of citizen-science the rapidly-expanding commercial space frontier.

In the next five days, you will embark upon a journey to understand the basic science behind the PoSSUM aeronomy research program and we will introduce fundamental skills while assessing your abilities to perform in IIAS research campaigns. On graduation, you will be able to enable cutting edge research through a variety of IIAS-sponsored research campaigns and also serve as ambassadors that can engage and educate the public about the upper atmosphere and the vital role that it plays in the study of our global climate through Project PoSSUM.

Even though man has maintained a presence in orbit for decades, the mesosphere is still largely an unknown. The mesosphere is a region that we have only briefly transited in our forays to orbital space. It is a region that harbors strange 'space clouds', strange electrical phenomena, and ionization that brings silence to vehicles reentering through it. It is an area too high to access by balloon or aircraft yet too low to access by orbital spacecraft. It is the most unknown part of our atmosphere, and yet soon we will have the means to access this elusive region and claim our presence there. We want our members to be the first explorers of the mesosphere, not just travelers passing through to orbit or returning from orbit, but there to understand.

As the tourist travels 'away from'; the explorer travels 'towards'. At the core, a scientist is an explorer; an explorer travels with an unbiased mind seeking to understand. To the explorer, the journey is the classroom. The explorer welcomes surprise. The explorer invites challenge to his assumptions and beliefs. The explorer realizes that everything and everyone that crosses the journey brings a lesson and an opportunity to grow, and welcomes the changes these influences bring. And as the explorer's environs reveal their secrets, the explorer accepts a responsibility to preserve the beauty of what is seen and experienced. The explorer becomes an ambassador and advocate of all that reveals itself during the journey, because one can never regain the ignorance of the times before the journey started.

We wish you all an exciting and rewarding week as you embark on your first step to becoming a full member of IIAS and an ambassador of Project PoSSUM.

Jason D. Reimuller, PhD
Executive Director, *International Institute for Astronautical Sciences*

Mission Statement

The Mission of the International Institute for Astronautical Science is to provide a high-value, immersive education within culturally-diverse operational environments that enable professional citizen-science research promoting multi-national space exploration, science literacy, and the equitable and peaceful uses of outer space. We embrace three core values:

Core Values

Democratizing Science

IIAS is a citizen-science organization that relies on private participation and funding in addition to traditional public funding sources to conduct and communicate science. IIAS strives to provide high-value, immersive educational services that enable peer-reviewed publishable science while communicating science to a global audience. The majority of IIAS research is privately funded through sponsorships and foundations.

International Stewardship

Understanding our shared global environment and laying seeds to be multi-planetary species are highly international objectives and IIAS embraces its diversity as an international organization. As of 2020, IIAS has students originating from 46 different nations.

Empowering All Communities

We believe that global issues demand a global response. We encourage and embrace everyone to participate in the process of conducting, publishing, and communicating science. IIAS sponsors outreach programs serving under-represented minorities in science including: the PoSSUM 13, Out Astronaut, and Space for all Nations.

Our Educational Philosophy

IIAS is a matrixed organization that integrates subject-matter experts with younger professionals and students. Unlike more hierarchical academic organizations that often impose an unspoken but rigid ceiling as to who may publish or serve as lead investigators, IIAS encourages all of its members to take the initiative to contribute to or lead scientific studies.

IIAS is an immersive educational institution; every course offered by IIAS serves to develop the student to participate and contribute directly to its professional citizen-science activities. Our students have studied mesospheric clouds from aircraft in remote regions of Canada, tested prototype space suits in microgravity, tested egress procedures and space suits in contingency post-landing environments, developed new methods to educate young students and engage under-represented communities, and developed a variety of technologies and experiments for high altitude, microgravity, or suborbital flight.

Because many professional students have outside obligations, IIAS courses typically combine academic instruction provided through our virtual classroom with immersive educational components involving intensive field research.

Redefining Citizen Science

Many people think of the citizen-scientist as an amateur science enthusiast volunteering to gather data for a government-funded scientist. Though such individuals provide a vital role in enabling and communicating science, PoSSUM and OTTER seek ways to create a broader model of citizen science – a model that can fund, conduct, and communicate professional, peer-reviewed science through a variety of means. By highlighting the value of science to society and producing enticing human stories of commercial value, we make science more democratic, more accessible, and less vulnerable to political agendas that drive governmental funding.

A Global Community

IIAS Students have traveled from over 50 different countries to attend courses held at our facilities in Canada and the United States. We believe that astronautics is inherently international and we celebrate our similar vision for life on and off the Earth, as well as our differences. Will you be your countries first graduate of astronautical science?

IIAS Directorship

Dr. Jason Reimuller	Executive Director
Dr. Armin Kleinboehl	Director of Aeronomy (PoSSUM)
Dr. Aaron Persad	Director of Bioastronautics
Mr. Ken Trujillo	Director of Operational Science
Dr. Shawna Pandya	Director of Space Medicine
Ms. Shayla Redmond	Director of Education
Dr. Aidyl Gonzalez	Director of Outreach
Capt. Winston Scott	Director of IIAS Advisory Board

Your AST 101 Instructors

Dr. Paul Buza	Aerospace Medicine
Dr. Erik Seedhouse	Aerospace Physiology
Mr. Ken Ernandes	Airborne Imagery
Mr. Kyle Collins	Flight Operations – Extra 300L
Mr. Chad Barber	Flight Operations – Extra 300L
Ms. Elenora Trevisani	Flight Operations – Cessna 172
Mr. Chris Lundeen	Lead Space Suit Technician
Mr. Vincent Rubio	Simulator Operations

IIAS Research Programs

In alignment with our mandate to empower all communities, IIAS currently sponsors three outreach programs serving under-represented minorities in science including: the PoSSUM 13, Out Astronaut, and Space for all Nations.



Project PoSSUM

Noctilucent clouds (NLCs) are the highest clouds in the Earth's atmosphere, 83 km (50 miles) and are observed slightly below the mesopause in the polar summertime. These clouds are of special interest, as they are sensitive to both global climate change and to solar/terrestrial influences. Project PoSSUM (Polar Suborbital Science in the Upper Mesosphere) studies these clouds through aircraft and balloon imagery techniques and is setting the stage for suborbital in-situ and tomographic imagery of mesospheric observables like NLCs.



Project OTTER

IIAS students in Project OTTER ('Operational Tools and Techniques for Extravehicular Research') work exclusively with Integrated Spaceflight Services to evaluate Final Frontier EVA Spacesuits through a multi-year research and evaluation program to evaluate spacesuit functionality, operational envelope, prototype suit/seat interface, seat ingress and egress operations, interface with biometric monitoring and communications systems, and CO2 washout tests.



IIAS Space Medicine Group

The IIAS Space Medicine Group (SMG) represents professionals within the IIAS community working on research, education and health initiatives in space and terrestrial medicine and health. SMG is currently working on three initiatives: 1) the Space Medicine Working Group (SMWG), 2) the Health Task Force (HTF), and 3) the 'Astronaut Mentality' educational outreach initiative.

IIAS Outreach Programs

In alignment with our mandate to empower all communities, IIAS currently sponsors three outreach programs serving under-represented minorities in science including: the PoSSUM 13, Out Astronaut, and Space for all Nations.

The PoSSUM 13



Created to honor the legacy of the Mercury 13, Project PoSSUM manages the PoSSUM 13 Project, a talented group of thirteen AST 101 graduates who serve as global ambassadors in increasing opportunity and representation for students — and especially young women— who have a passion for space science and exploration. Through a combination of educational outreach initiatives and mentorship, the PoSSUM 13 will serve as representatives for citizen science, striving to increase opportunities and representation for students — notably young women and girls — who have a passion for space science.



Out Astronaut

The Out Astronaut Project addresses the under-representation of Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) people in science and space. Astronauts inspire our youth, represent limitless possibilities, and serve as ambassadors to STEM. We highlight the contributions of LGBTQ members currently working in science and space and provide grants to promising LGBTQ students currently pursuing professions in space-related fields.



Space for all Nations

Space For All Nations helps emerging space nations work among themselves to participate in pure science ventures of global importance while creating opportunities for these nations to collaborate with established space nations. Space For All Nations helps its member institutions develop STEM outreach activities within their own nations to inspire the next generation of space professionals.

Academic and Philanthropic Character

The primary mission of the International Institute for Astronautical Sciences (IIAS) is to advance the application of science research promoting space exploration, science literacy, the equitable and peaceful uses of outer space, and solutions to pressing challenges on Earth. As such, the work of IIAS is conducted in the spirit of collaboration for mutual and universal benefit, with the full intention of being published and open sourced according to academic best practice.

The specific requirements for publishing and releasing IIAS work products, as well as the policy on ongoing deployment of its scientific outputs, are detailed in this guidance.

Talking Points

Purpose: The purpose of AST 101 (a.k.a the PoSSUM Scientist-Astronaut Qualification Program) is to provide an immersive educational experience which will provide background and an understanding of how to fly the PoSSUM Noctilucent Cloud Tomography mission while providing a practical background for graduates to contribute to IIAS citizen-science research efforts. We expect AST 101 graduates to be able to communicate the PoSSUM mission and have a foundation for future IIAS research.

Prerequisites: As our resources are limited, we accept a limited number of candidates per year. The reason for the requirement for a B.S. degree in a STEM field is that we expect graduates to be effective communicators of the science behind the PoSSUM mission, and most publications on the topic assume a science and math understanding at this level. All Advanced PoSSUM Academy students are eligible to qualify as a PoSSUM Scientist-Astronaut Candidate upon graduation with a qualifying B.S. degree from an accredited institution and approval from the IIAS selection panel.

Regarding NASA: Neither PoSSUM nor IIAS are “NASA programs”. PoSSUM evolved from a NASA sponsored flight opportunity granted in March 2012 in which three technology maturation flights were awarded for IIAS instrumentation including the video camera, IR camera, and WFI instrument. PoSSUM is supported by the international aeronomy community as a flagship EPO program, as well as various EPO and outreach partners.

Regarding Florida Tech: Florida Tech is a member of the IIAS consortium of partner organizations and the host of AST 101, as well as our EVA 104 gravity-offset EVA space suit evaluation course. Other IIAS research partners include the National Research Council (NRC) of Canada, the Canadian Space Agency, SAMI, and Survival Systems USA in Groton, CT.

Qualification: It is essential that IIAS maintain professional credibility with its partners. Thus. All AST 101 graduates should not consider themselves ‘astronauts’, ‘astronaut-candidates’, ‘astronaut trainees’; rather ‘PoSSUM Scientist-Astronaut Program Graduates’ that have received initial training to fly the PoSSUM tomography mission. Graduates may also refer to themselves as ‘IIAS Students’ or ‘IIAS Members’.

The fact that all training elements in the PoSSUM program directly tie to more effective instrument operation, and all instrument operations are directly tied to meeting well-defined science objectives, and that the mission can only be a manned mission because one cannot automate what one cannot see from the ground or from space, establish the credibility and justification of the program. IIAS is not an “astronaut training” organization; rather, IIAS is a research organization that conducts research related enabling human space flight. IIAS always builds itself around furthering science, striving to always exceed expectations and not over-promise or overcommit itself.

IIAS Programs: IIAS works to provide professional opportunities to its members, including professional education programs, involvement with research initiatives, and general education programs. IIAS exclusively manages the

microgravity, gravity-offset, and post-landing/NBL test facilities to support its courses, and all AST 101 graduates in good standing are free to participate in these programs.

IIAS's Applied Astronautics graduate credential program is a continuing education, professional development program designed to provide broad, practical education geared to the professional interested in a career in commercial astronautics. It is designed to complement a traditional aerospace engineering curriculum. IIAS members and students are also actively involved in spacesuit technology development efforts, instrumentation development for the PoSSUM aeronomy experiments, and outreach and education programs.

Flight Opportunities: IIAS cannot commit or promise flights to any members; however, IIAS is vested in the long-term success of its members and graduates. IIAS actively engages grantors and sponsors to support its research objectives, some of which will be used to subsidize flight opportunities. The media story is also a marketable asset that we use to seek further funding. Finally, as a 501(c)(3) non-profit organization, contributions to IIAS-sponsored flights are tax-deductible.

Description of Partnerships and Administration

The IIAS is a Doing Business As (DBA) for Project Polar Suborbital Sciences in the Upper Mesosphere (PoSSUM), a Colorado 501c3 nonprofit organization. Partnerships with space agencies, institutions, private industry, and academia aim to test, research, and evaluate hardware, pressurized space suits, and other emerging technologies applied to suborbital operational science capabilities, flight engineering systems, aeronomy, and bioastronautics.

Table 1: IIAS Partner Research Centers, Locations, and Facilities	
IIAS Headquarters	Boulder, Colorado, USA
IIAS Satellite Research Centers	<ul style="list-style-type: none"> · Survival Systems USA, Groton, CT (SSUSA) · Florida Institute of Technology, Melbourne, FL (FIT) · Hypobaric and Hyperbaric Research Facility, Melbourne, FL (SAMI) · National Research Council Flight Research Laboratory, Ottawa (NRC) · Canadian Space Agency Headquarters, Montreal (CSA)
IIAS Field Campaign Locations	<ul style="list-style-type: none"> · San Francisco Volcanic Fields, Flagstaff, AZ · Yellowknife Airport, Yellowknife, NWT · Boulder Municipal Airport, Boulder, CO.
Institutional Facilities	<ul style="list-style-type: none"> · Reduced Gravity Laboratory (NRC) · Gravity-Offset Laboratory (CSA) · Post-Landing Human Factors Laboratory (SSUSA) · Hypobaric and Hyperbaric Altitude Chamber (Melbourne, FL) · Research and Training Aircraft (Marchetti S-211*, Mooney M20K, Cessna 310*, Extra 300/L, Cessna 172*) · Instrumentation and Remote Sensing Laboratory (Boulder, CO) · Space Suit Testing Laboratory (Melbourne, FL) · IIAS Orbital Space Flight Simulator (Melbourne, FL) · IIAS Suborbital Space Flight Simulator (Melbourne, FL) · Neutral Buoyancy Lab (approximately 14m x 9m x 12m) (SSUSA)

SCUBA Certification	· IIAS maintains a partnership with the National Association of Underwater Instructors (NAUI) for all SCUBA-related activities at Survival Systems USA.
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Administrative Policies and Procedures

Purpose and Scope

To assure safe, efficient and harmonious operations and to fully inform all employees of their responsibilities in this regard. This policy applies to all employees at all locations of IIAS and its institutional partners, including Florida Tech. We expect employees to carry themselves in a way that reflects well on the university, our students, employees and our mission.

Policy

1. IIAS work rules are established for the guidance of all members. The work performance infractions are only a partial list of unacceptable behaviors and conduct, as a complete list of all possible violations would be impossible to compile.

2. Infractions may lead to disciplinary action. Committing any of the infractions on the list may be sufficient grounds for disciplinary action ranging from reprimand to immediate discharge. (See also policy [8.3.5 Employee Discipline](#))

3. Work Performance Infractions (partial list):

A. Falsification of records, including employment application, timesheets, expense reports, etc.

B. Damage or destruction of university property due to careless or willful acts.

C. Negligence in observing fire prevention and safety regulations.

D. Inability or unwillingness to work in harmony with others; discourtesy to students, other employees or any persons doing business with the Institute.

E. Theft, fraud, gambling, carrying concealed weapons or explosives, or violation of criminal laws on university premises.

F. Fighting, throwing things, horseplay, practical jokes or other disorderly conduct which may endanger the well-being of anyone or Institute operations.

G. Threatening, intimidating, harassing, bullying, coercing, using abusive or insulting language, or otherwise interfering with performance of other employees.

H. Insubordination or refusal to comply with instructions or failure to perform reasonable duties which are assigned.

I. Excessive or unexcused absenteeism or tardiness.

J. Engaging in other practices that may be inconsistent with the ordinary and reasonable rules of conduct necessary to the mutual welfare of the Institute, its employees and students.

K. Misuse of computer equipment, to include tampering with any computer system and/or failure to comply with applicable state and federal laws and Institute policies and procedures.

L. Viewing, saving, posting, or sending obscene, pornographic, sexually explicit, or offensive material in hardcopy, digital, video, or any other media format.

M. Surreptitious taping/recording of conversations among employees or with students.

N. Failure to comply with instructions, directives, policies, or procedures of the Institute or authorized Institute officials, or the commission of acts that seriously damage, compromise, impair or impugn the image, reputation, or standing of the Institute.

O. Actions that have a material adverse effect on or bring serious disrepute upon the Institute. This includes personal conduct and personal speech (print, media, *social media, etc.) both in and outside the work place.

4. What do I do if I am arrested and charged with a crime?

We go to great lengths to ensure the safety and security of our students, faculty and staff. For this reason, we require that any faculty or staff member who is arrested and charged with a crime, notify an IAS director within seventy-two (72) hours of the arrest. Additionally, if the arrest occurred before being hired and resulted in a conviction, this conviction must be reported to an IAS director within seventy-two (72) hours of the disposition.

Each situation will be reviewed on a case-by-case basis taking the severity of the crime and safety and security of our students, faculty, and staff into consideration. Possible outcomes may include suspension or disaffiliation from the Institute.

Failure to report an arrest or conviction according to policy will result in disciplinary action up to and possibly including disaffiliation from the Institute.

***Social Media Usage Disclaimer:** If an IAS member chooses to engage in social media, the institute offers the following good practice suggestions:

- When using social media, take care not to violate statutory or common law requirements. Do not violate any other person's or entity's copyright, trademark, or other intellectual property rights, and do not make statements that may damage a person's or entity's reputation, image, opportunities, or advantages. Such actions may have civil or criminal consequences personal to you. Similarly, the Institute reserves the right to take disciplinary action against members whose unauthorized actions, comments, and other web behavior materially and adversely affects or brings serious disrepute upon the Institute.

- Unless your use of social media is part of your official duties, do not speak in an official IAS capacity when using social media. The Institute may not assist or protect you in the event you become involved in legal actions arising from such activities.

Press Policy

IIAS firmly believes in furthering the understanding and awareness of space-related technologies, methodologies, and mission goals that provide a direct benefit to all of us here on Earth. Whenever possible, we're pleased to provide access to our facilities, technology, and staff.

Press and Media Requests

Any member of the media wishing to engage with IAS need simply contact us at info@astronauticsinstitute.org and we'd be happy to discuss the opportunity! All requests for press ready materials, interviews, and any other PR-related questions regarding IAS can be directed to this address.

Documentation and Distribution

Due to certain government export restrictions, contractual obligations, and the sensitive nature of aerospace technology, we cannot always share as broadly as we would like. In compliance with all applicable restrictions, photography, videography, audio recording, and/or other forms of documentation of IAS technology are strictly prohibited without prior discussion and approval from IAS management. Any distribution of documentation and/or copyrighted material in print or digital format, including online social media, is also prohibited without prior discussion and approval. Such approval is based on three documentation and distribution categorizations as described below. NOTE: Documentation and distribution that falls under Category 3) below do NOT require any further approvals from IAS.

Documentation and Distribution Categories

IIAS categorizes its technology under three categories. All individuals wishing to document IIAS technology should be made familiar with these lists.

1) Prohibited

Items in this category ARE NEVER SUITABLE for documentation and/or distribution without a proper NDA procedure set in place.

- Space Suit Patterns
- CAD
- Manufacturing Methods
- Order of Ops Procedures
- Internal blueprints, drawings, concepts, etc.
- Human-rating documents related to certifications and approval
- Space suits WITHOUT a cover garment
- Space Suit Cleaning & maintenance protocols
- Closeup / detailed photographs of design features

2) Controlled

Items in this category MAY BE SUITABLE for documentation and/or distribution depending on applicable restrictions and/or contractual obligations. Because this varies, this must be discussed on a case-by-case basis.

- Any individual associated with IIAS, its partners, and/or its clientele
- Prototypes
- Certain manufacturing technology (welders, laser cutter, 3D printer, etc.)
- Space suits during donning or doffing

3) Approved for Viewing

Items in this category ARE FULLY APPROVED for documentation and/or distribution.

- Space Suit WITH COVER GARMENT or anything that is already publicly available.

Publishing: Authorship and Acknowledgements

Publishing of results: The formal results of IIAS research will be published in various journals, conferences, and platforms. The IIAS supports individuals and teams who want to publish formally in journals prior to any external release.

Established Requirements

Below you will find the IIAS established requirements for posters, abstracts, and papers that are developed as a direct result of IIAS research:

- Each researcher's name must be listed as authors on published papers, abstracts, or posters, including guest contributors;
- The order of authorship should be determined unanimously as a team in consultation with your IIAS Director or course Instructor and using author determination and tie-breaker tools. ([Determination Scorecard](#) guidance below);
- Any core team of researchers are considered 'first authors'. With authors that contributed equally indicated with a '+' symbol. The default order of authorship is to include contributors in alphabetical order

by surname, unless the team agrees to any departure from this for ‘first authors’ based on relative contribution;

- Individuals who are listed first acknowledge the expectation that they take a leadership role working to drive the work going forward beyond IIAS, such as ensuring quality control of outcomes, initiating any deployment activities, thorough documentation, and other follow-on duties beyond writing the paper itself, such as being corresponding authors.
- Core IIAS instructors or Directors should be listed after researchers unless it is determined that the IIAS instructor or Director contribution merits first author status. In these cases, the IIAS instructor or Director must have made significant contribution to the results or codebase and have taken on substantive writing duties.
- Where IIAS instructors or Directors are listed in the final position this should be set by the most senior IIAS instructor or Director who has been supervising. Supervising IIAS instructors or Directors may include individuals acting as a subject matter adviser, who have guided or overseen the development of methodology, testing, and research.
- International Institute for Astronautical Sciences must be referenced in the acknowledgments of any papers, abstracts, and on posters. [IIAS Acknowledgements Boilerplate](#) language is provided below.
- Itinerant contributors, reviewers, IIAS instructors, IIAS Directors, or other researchers from another team are not guaranteed authorship, however: Please acknowledge partners who have made a contribution to your work (refer to [The Contributor Roles Taxonomy \(CRediT\)](#) system) by utilizing acknowledgements when possible to ensure all contributions are captured - such as those of partners or individuals involved in data collection/compilation, research preparation, methodology design, provision of resources and other material contributions.
- International Institute for Astronautical Sciences does not support “gift authorship” or “ghost authorship.”

In the cases where a first author listing is difficult to resolve, teams are encouraged to wait until papers are completed to determine ‘fairness’ based on relative contribution in the long term - whether that be the written component, deployment, or ongoing management of any code or data product. Some teams may choose to share by taking turns to be listed first on a number of papers should your team have enough appropriate outcomes. If this is unresolvable, then teams are requested to use alphabetical order, or an [Author Tiebreaker Scorecard](#) mentioned below.

Determination Scorecard

[Author Determination Scorecard](#)

Author Tiebreaker Scorecard

[Author Tiebreaker ScoreCard](#)

Addendums to Authorship List

Please include:

* *Corresponding authors*

† *These authors contributed equally to this work.*

IIAS Acknowledgements Boilerplate

"This work has been enabled by International Institute for Astronautical Sciences (IIAS) (<https://astronauticsinstitute.org>) and supported by [list all partners that contributed].

IIAS Intellectual Property

The intellectual property policy for all IIAS research is governed by this document. Researchers wishing to pursue original work generated during IIAS relevant to their technical or scientific contribution must have permission granted in writing from IIAS, the official holder of the Intellectual Property (IP), upon timely request before releasing under an open license. However, under this agreement, IIAS has the right to use any original work for its own purposes, as part of a no royalty-free, unlimited license. (35 U.S.C. 202, 14 CFR Part 1245, and Executive Order 12591.)

Any background IP (research, hardware, tools, software, patents, processes, copyrighted material) generated by individuals or partners *prior* to involving IIAS will remain the property of the contributing individual or partner.

Trustworthiness and Ethics

A cornerstone of science is the possibility to critically assess the accuracy or correctness of scientific claims and conclusions reached by other scientists and researchers. This entails a precise approach and documentation of procedure and analysis, as well as careful attention to potential sources of systemic and statistical error.

IIAS has established and actively works to maintain industry leadership in suborbital operational science capabilities, flight engineering systems, aeronomy, bioastronautics, and space science trust, ethics, and standards benchmarking.

IIAS findings, outcomes, publications, and reports are considered credible because of the institution's reputation for providing objective and impartial results. Results are a product of high standards of scientific and technical quality as well as high fidelity environments. Checks and balances are applied at every step in the research process to protect the integrity of the work and maintain scientific confidence.

As such, IIAS teams should ensure meticulousness in:

- (i) identifying standards, requirements, benchmarks, and methodologies to rigorously assess results;
- (ii) developing precautionary methods to ensure that non-causal variables do not confound results;
- (iii) documenting and describing safeguards to avoid accidental manipulation, biases, or over-fitting; and
- (iv) detecting and documenting possible sources of data drift or incompleteness which may result in biased outcomes.

All IIAS results should be reproducible (the ability to redo an experiment and get the same results). Reproducibility measures the ability to replicate the findings of others - a perpetual issue in scientific research, addressed with proper documentation that allows IIAS partners and any third parties to reproduce results reliably. IIAS adheres to the principles of [Open Science](#) mandated by NASA's Science Mission Directorate as well as the National Academies of Sciences, Engineering, and Medicine (NASEM):

[NASA Science Strategy 2020-2024: A Vision for Scientific Excellence.](#)

Spin-offs, Deployment, and Impact

IIAS is a research and education institute that encourages the potential deployment of research developed as part of IIAS. Please note that IIAS requests briefings and participation and/or first refusal on ongoing research and deployment, as the initial risk taking, partnership brokering, data provision, and administrative entity.

IIAS has established an Impact Committee to assist in the ongoing development and deployment of IIAS research.

In cases where the work has evolved since the end of IIAS testing, evaluation, and involvement and the use-case is no longer in coherence with the original work, then teams are encouraged to pursue work under their own aegis.

Individuals or teams who wish to pursue the work on their own for non-academic, business, or charitable purposes must gain written permission from IIAS and any non-participating team members or collaborators.

Diversity, Equity, and Inclusion of Under-represented Groups

IIAS has made a commitment to supporting the research careers of our researchers as well as redressing the imbalance of under-represented groups in space science. In 2019, IIAS launched three outreach initiatives to actively address gaps for these communities and provides opportunities to researchers from all genders, sexual orientation, ages, and ethnicities from around the world. Details regarding the Space for All Nations, Out Astronaut, and POSSUM 13 initiatives can be found at <https://astronauticsinstitute.org/about/sponsored-outreach-programs/>.

Please note that IIAS cannot accept individuals born or domiciled in countries on the US Government's 'Designated Countries' list, which can be found here: https://oiir.hq.nasa.gov/nasaecp/docs/DCList_10-24-2018.pdf. IIAS research, participants, and experiments are compliant with the International Traffic in Arms Regulations (ITAR).

Data Transparency

Principles for data in research

In order to build off results and increase the ability of replicability of results and overall transparency, IIAS datasets adhere to the FAIR (findable, accessible, interoperable, reusable) principles. IIAS will seek to help you host your project data where possible.

FAIR Principles [5]

Findable

The first step in (re)using data is to find them. Metadata and data should be easy to find for both humans and computers. Machine-readable metadata are essential for automatic discovery of datasets and services, so this is an essential component of the [FAIRification process](#).

[F1. \(Meta\)data are assigned a globally unique and persistent identifier](#)

[F2. Data are described with rich metadata \(defined by R1 below\)](#)

[F3. Metadata clearly and explicitly include the identifier of the data they describe](#)

[F4. \(Meta\)data are registered or indexed in a searchable resource](#)

Accessible

Once the user finds the required data, she/he needs to know how can they be accessed, possibly including authentication and authorization.

- [A1. \(Meta\)data are retrievable by their identifier using a standardized communications protocol](#)
- [A1.1 The protocol is open, free, and universally implementable](#)
- [A1.2 The protocol allows for an authentication and authorization procedure, where necessary](#)
- [A2. Metadata are accessible, even when the data are no longer available](#)

Interoperable

The data usually need to be integrated with other data. In addition, the data need to interoperate with applications or workflows for analysis, storage, and processing.

- [I1. \(Meta\)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.](#)
- [I2. \(Meta\)data use vocabularies that follow FAIR principles](#)
- [I3. \(Meta\)data include qualified references to other \(meta\)data](#)

Reusable

The ultimate goal of FAIR is to optimize the reuse of data. To achieve this, metadata and data should be well-described so that they can be replicated and/or combined in different settings.

- [R1. Meta\(data\) are richly described with a plurality of accurate and relevant attributes](#)
- [R1.1. \(Meta\)data are released with a clear and accessible data usage license](#)
- [R1.2. \(Meta\)data are associated with detailed provenance](#)
- [R1.3. \(Meta\)data meet domain-relevant community standards](#)

The Contributor Roles Taxonomy (CRediT)

#	Role	Definition
1	Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.
2	Data curation	Management activities to annotate, scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.
3	Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.
4	Funding Acquisition	Acquisition of the financial support for the project leading to this publication.
5	Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
6	Methodology	Development or design of methodology; creation of models.
7	Project Administration	Management and coordination responsibility for the research activity planning and execution.
8	Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.
9	Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.
10	Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.
11	Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.
12	Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
13	Writing—original draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
14	Writing – review & editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages

For Academics: Begin allocating the terms appropriately to your contributors within research outputs. Advocate that your institution and any publications you're submitting acknowledge and adopt the taxonomy.

For Publishers: CRediT adoption can be achieved via a manual workflow outside of Submission and Peer Review systems, or through using a system with an existing CRediT integration. The roles given in the above taxonomy include, but are not limited to, traditional authorship roles. The roles are not intended to define what constitutes authorship, but instead to capture all the work that allows scholarly publications to be produced.

Recommendations for applying the CRediT taxonomy:

1. **LIST ALL CONTRIBUTIONS** – All contributions should be listed, whether from those listed as authors or individuals named in acknowledgements;
2. **MULTIPLE ROLES POSSIBLE** – Individual contributors can be assigned multiple roles, and a given role can be assigned to multiple contributors;
3. **DEGREE OF CONTRIBUTION OPTIONAL** – Where multiple individuals serve in the same role, the degree of contribution can optionally be specified as 'lead', 'equal', or 'supporting'; and
4. **SHARED RESPONSIBILITY** – Corresponding authors should assume responsibility for role assignment, and all contributors should be given the opportunity to review and confirm assigned roles.

IIAS Academic Honesty & Plagiarism Policy

All members of the International Institute of Astronautical Sciences (IIAS) shall conduct themselves in accordance with the highest principles of academic honesty. Cheating, plagiarism, copyright violations, or other forms of academic dishonesty are prohibited and not tolerated.

The submission of another person's ideas or words, without acknowledging their source, constitutes plagiarism. Plagiarism is a serious form of academic misconduct that is inconsistent with the IIAS Code of Conduct and Ethics. Penalties for plagiarism can range from a reduction in grade to being dismissed from the program. Therefore, it is important to understand plagiarism and prevent it in your work.

If this policy is violated, appropriate disciplinary action shall be taken, and attempts shall be made to resolve the situation, correct the behavior, and maintain the integrity of the IIAS. Policy violations are recorded and kept on file.

IIAS Code of Business Conduct and Ethics

The International Institute for Astronautical Sciences (IIAS) is committed to conducting business in compliance with all applicable laws, rules, and regulations, and in accordance with the highest standards of business ethics. IIAS strives to create a productive, safe, respectful, and fair working and learning environment. This *Code of Business Conduct and Ethics* ("Code") alerts IIAS participants, employees, students, volunteers, partners, and affiliates to areas of ethical risk, and provides guidance and information to help recognize and deal with concerns.

Anyone can elevate questions, concerns, or allegations without fear of retaliation. *If you see something, say something.*

All individuals involved with IIAS must agree and sign that they will adhere to this *Code*. Feel free to contact an IIAS director or send an email to ethics@projectpossum.org if you have any questions pertaining to this document.

As IIAS participants, employees, students, volunteers, partners, and affiliates are responsible for adhering to the organization's professional and ethical standards while complying with IIAS policies, procedures and applicable contractual and legal requirements. The *Code* cannot and does not anticipate every possible situation that could arise in the course of business, science campaigns, or education efforts; therefore, you must use good judgement in adhering to these standards. Anyone who violates this *Code*, permits a peer or colleague to do so, or fails to promptly inform a supervisor, Director, or Educator of a known violation will be subject to disciplinary action.

Our actions must consistently demonstrate that we fairly, respectfully, and truthfully deal with our peers, students, educators, colleagues, clients, vendors, and partners. This ethical standard demonstrates to all collaborators that IIAS can be trusted to do the right thing when managing their resources and that IIAS is a worthy partner as they seek to realize their professional and scientific missions.

Statutes

The IIAS International Statutes require participants, employees, students, volunteers, partners, and affiliates:

- A. to act in accord with the statutory requirements of respective countries where IIAS conducts business, citizen science campaigns, and hosts education efforts;
- B. to exercise all due and proper responsibility in all financial matters, including accuracy of fundraising and application of funds in pursuance of the organization's stated objectives; and
- C. to employ responsible media, social media, and marketing techniques; promotion and advertising must be truthful, accurate, and be approved by the IIAS Director, Dr. Jason Reimuller.

Integrity

At IIAS, we comply with the rules and do the right thing.

Preventing Fraud

Fraud is falsifying or withholding information for personal or financial gain. Examples include, but are not limited to:

- Falsified travel vouchers, invoices, time sheets, receipts, or research data;
- False certifications or information on qualifications;
- False property or scientific equipment records;
- Excessive purchases diverted for personal use.

IIAS' policies, procedures, and professional management of staff are designed to minimize vulnerability to fraud in financial transactions, research results reporting, scientific outcomes, publications, grant awards, and the procurement of goods and services. You are responsible for assisting IIAS to prevent fraud by:

- Ensuring financial, procurement, and grant-related transactions accuracy and completeness of information;
- Ensuring documents in support of qualifications are accurate; asking questions regarding documents, certifications, and performance, especially when you suspect inconsistencies;
- Independently verifying information or spot-checking information in results reports or publications;
- Assuring physical control and inventory of physical assets;
- Regularly assessing risks and revising policies and procedures as necessary; and

- Completing ethics training, regularly discussing ethical issues with direct reports, and sharing best practices and concerns to reinforce an organizational culture of ethical behavior and compliance.

Preventing Bribery and Corruption

You must avoid any activity that would breach the Foreign Corrupt Practices Act (FCPA), local law, or international standards of best practice. You are responsible for assisting IIAS to prevent bribery and corruption:

- Bribery. Do not directly, or indirectly, solicit, accept, offer, promise, or give a bribe or other improper payment, gift, favor, or hospitality to obtain or retain business, approvals, or other improper advantage.
- Facilitation Payments. Do not make small payments to facilitate approvals or actions on the part of government officials. Facilitation payments are prohibited. Under certain circumstances, IIAS may pay for the commercial services of an expeditor to process goods through customs. The terms of reference in the associated contract must be explicit and must prohibit payments to facilitate approvals on the part of a government official.
- Kickbacks. Never ask for or accept anything of value from vendors, suppliers, or contractors who do business with IIAS. You may accept gifts and hospitality of nominal value (a meal offered during the course of a business meeting, for example, or a notepad with an organization's logo on it).
- Gratuities. Never pay or provide gifts, favors, or hospitality to a government official after you receive a favorable action or decision.

Contributions

Do not make contributions to candidates for public office or to political parties or other political organizations on behalf of IIAS.

- Hospitality, Nominal Gifts, and Honoraria. IIAS-approved advertising items of nominal value (pens, hats, lapel pins, patches, tee-shirts, and so on), plaques, and certificates of recognition may be offered to government officials. Modest meals, refreshments, and non-alcoholic beverages in accordance with local customs and practices are also allowed. However, in no event should the value of the courtesy exceed \$20 per person/per occasion or \$50 per person annually. Honoraria to host government officials must be nominal and occasional for work outside normal duties and working hours to avoid conflicts with official duties.
- Awareness. Promote training and practices that raise awareness among our partners and affiliates of the global fight against bribery and corruption.

Making the Right Decision and Documenting It

Ethics is the foundation of successful performance. While it may sometimes appear tempting to take short-cuts for the sake of expediency in the pursuit of project goals, this can be avoided with timely and proper planning. If you *are* confronted with an urgent problem that appears to necessitate making an exception to an IIAS policy, immediately consult with a senior manager and the IIAS Director. Do not delay in documenting the reasons for the policy exception, making sure to describe the issue, circumstances, and outcome of the decision.

Protecting Information and Data

You must be vigilant in protecting proprietary and confidential information obtained in the performance of IIAS work and research. Any information which, if released, would have an adverse impact on an individual's privacy or a business/organization's competitiveness, or on client programs or their foreign relations, is considered proprietary or confidential and must be controlled and restricted. Examples of proprietary or confidential information include non-public research-sensitive information, financial reports, financial performance documents, financial plans, medical and personal information, and any IIAS proposal details. You may not disclose any non-public information related to a client, partner, student, or participant for any reason. If you need to send confidential information outside IIAS, senior management written approval or a non-disclosure agreement may be needed.

Complying with International Trade Sanctions

Carrying and sending goods from one country to another is subject to the customs laws of the transit nations. Certain goods — such as science equipment, software, food products, chemical substances, and valuable items — can be subject to heightened customs and export controls. When you carry or ship items abroad on behalf of IIAS or for an IIAS citizen science campaign, do your research about the country of origin and the destination country. Make sure you only carry or ship goods abroad if you are sure there are no restrictions at either end of your itinerary. Questions can be directed to ethics@projectpossum.org.

Is it confidential information?

If your answer to any of the following questions is “yes”, the information is confidential and should be protected:

- Is this information a trade secret?
 - Would IIAS be disadvantaged or harmed if others knew this information?
 - Would your science or research be jeopardized if the information was not held in confidence?
 - Does the information include personal identification that jeopardize an individual’s privacy?
-

Responsibility

Your Duty to Seek Advice or to Report

When you encounter improper or questionable behavior or suspected violations of the *Code of Business Conduct and Ethics*, you are expected to consult quickly with your/a supervisor, Director, or Board of Directors member. Your concerns or allegations may be raised confidentially and anonymously—without fear of retaliation—through an email or in person. Timely notification permits IIAS to resolve issues expeditiously. Timeliness also permits IIAS to inform clients, partners, or affiliates of possible malfeasance that may require their involvement. If you fail to report suspected ethical violations promptly, you may be considered culpable and you may jeopardize IIAS’ ability to quickly and appropriately respond to the issue.

Training Requirements

Periodically, you will be required to take the IIAS ethics training, and provide a written certification that you have reviewed, understand, and agree to comply with IIAS’ *Code of Business Conduct and Ethics* and that you are not personally aware of any violations of the *Code* by others. This certification is your pledge to honor and fully comply with the *Code*’s provisions. You are subject to disciplinary action, up to and including expulsion from programs, termination, or persona non grata status if you fail to do so.

Your Responsibility

You should feel safe in reporting concerns and/or allegations, and confident that IIAS will respond appropriately. You can, and should, make decisions and take actions on issues when it falls within your authority to do so. When you see something, say something. You are also responsible for:

- Following IIAS *Code of Business Conduct and Ethics*;
- Taking ethics training and participating in supplemental reviews and meetings to ensure that you are fully aware of the issues involved;
- Notifying your supervisor, senior leadership, Executive team member, Board member or the formal ethics@projectpossum.org email if you suspect fraud, conflict of interest, bribery, facilitation payments, kickbacks, gratuities, other corrupt practices, or any violation of the *Code*; and
- Seeking assistance or clarification to avoid unethical or illegal conduct prior to taking a questionable action.

Your Responsibility as a Leader

If you are an IIAS manager, supervisor, educator, Executive team member, or Board member, you are responsible for ensuring that your team, students, volunteers, and peers understand and follow the *Code of Business Conduct and Ethics*.

You must establish and maintain a culture in which all participants feel comfortable doing what's right and uncomfortable doing wrong. Make yourself available for questions and elevate ethical issues or allegations immediately to the proper level.

Leaders must be ethical role models, demonstrating integrity, accountability, and respect for everyone, and regularly communicating IIAS' expectations for ethical conduct while professionally and personally supporting these expectations.

Safe, Secure, and Healthy Environment

The safety and security of our participants, employees, students, volunteers, partners, and affiliates, are our top priorities. IIAS will ensure that appropriate arrangements, processes, and procedures are in place to provide this secure environment, taking into account the operating environment and level of risk involved in the performance of the science and research. You are expected to be alert to your surroundings to avoid vulnerable situations. You must immediately report any threats or incidents in accordance with procedures established for each individual campaign or education effort.

IIAS is committed to providing a learning environment free from illegal drugs, violence, threats of violence, and the influence of alcohol. The illegal use, sale, purchase, transfer, or possession of any controlled substance while conducting IIAS business, science, and/or research is strictly prohibited. We all have a duty to comply with health and safety rules. Any violations, accidents, or injuries should be promptly reported to management.

Respect and No Harassment

IIAS' diversity is essential to its success as an institute. We treat others as we would like to be treated ourselves. We value each other's work, research, and roles within the organization. This respect builds trusting relationships that promote teamwork and nurture an organizational climate that is fair, supportive, and responsive. We recognize that our words and actions are crucial to maintaining this professional environment.

IIAS is committed to maintaining an environment where all participants feel respected, valued, and free of harassment. Our team is dedicated to providing a harassment-free experience for participants regardless of gender, age, sexual orientation, gender identity, disability, physical appearance, body size, race, religion, or other protected status. If you have any questions or concerns about possible discrimination or violations of the equalities policy, please email ethics@projectpossum.org.

Zero Tolerance and No Sexual Harassment

IIAS is intended for professional education, research, training, science, and collaboration. While at IIAS-managed trainings, science campaigns, meetings, or related ancillary or social events, any participants, including speakers, professors, educators, attendees, volunteers, sponsors, staff, students, partners, and anyone else, should not engage in harassment in any form.

All participants, employees, students, volunteers, partners, and affiliates are expected to behave according to professional standards and in accordance with IIAS policies on appropriate workplace behavior.

References

- [1] <https://www.apa.org/science/leadership/students/authorship-paper.pdf>
- [2] https://publicationethics.org/files/2003pdf12_0.pdf
- [3] <https://publicationethics.org/news/wcri-2019-responsible-authorship-panel>
- [4] <https://www.casrai.org/credit.html>
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