

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
New Worlds - Non-Traditional Space Education and Outreach (7)

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AN INTERNATIONAL INSTITUTE FOR ASTRONAUTICAL SCIENCES (IIAS) ONLINE CITIZEN  
SCIENCE COURSE FOR RESEARCH PROPOSAL DEVELOPMENT AND PEER REVIEW**Abstract**

In 2018, the International Institute for Astronautical Sciences (IIAS) developed a unique citizen science research course that enables participants—from undergraduates to postgraduates—to propose and develop their own research proposals, and critically review the proposals of their classmates. This is done by providing an overview of current citizen science research foundations, describing current knowledge gaps, and brainstorming possible ways to address these gaps. By the end of the course, participants are expected to achieve the following learning objectives: (1) describe existing citizen science work supported by space agencies, (2) design and propose citizen science research projects, (3) demonstrate the requirements for designing, submitting, and conducting human subject research, (4) communicate the current gaps in knowledge within bioastronautics, extravehicular activity, space operation analogs, spacecraft technologies, and aeronomy research, and (5) develop and present a citizen science research project proposal with objectives, procedures, budget, and data collection and analysis strategy. Using Bloom's Taxonomy of Learning as a framework, these learning objectives address each level of mastery needed to create highly qualified personnel in citizen science research. Course participants move through the learning stages of *Remembering* and *Understanding* by learning about what opportunities and challenges exist in citizen science, to the stages of *Applying*, *Analyzing*, *Evaluating*, and *Creating* through their project proposals and peer project review. Since its inception, this course has run annually and has yielded 19 independent citizen science research project proposals, from 19 participants in 5 countries. To date, 3 of these proposals have been submitted to funding organizations seeking a combined \$460,000 USD in project funding. Lessons learned from course evaluations and instructor feedback, which have been iteratively included into the curriculum since course inception, includes incorporation of (1) guest speakers from space agencies, (2) peer review and feedback on research proposals, (3) a step-by-step, structured approach that develops research proposals in sections over time, and (4) research funding opportunities within a wide array of disciplines. Altogether, this course, with its IIAS parent institution, serves to provide a high-value, immersive, international environment for citizen science research that democratizes, inspires, and empowers participation in space exploration, science literacy, and peaceful use of outer space.