

## SPACE LIFE SCIENCES SYMPOSIUM (A1)

Public Outreach and Education - Integral Elements of Space Life Sciences Program Development (8)

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## THE HARVARD-MIT PHD. PROGRAM IN BIOASTRONAUTICS

**Abstract**

The Bioastronautics project plans for the training of the next generation of leaders in space life sciences, especially in the protection of human space travelers. ([hst.mit.edu/bioastro](http://hst.mit.edu/bioastro)). We have seen the intense interest that our undergraduates at MIT have in this field and note that they lacked a clear path through a graduate education to participation in it. Many graduate students are already involved in bioastronautics through research assistantships and, collectively, they represent a formidable cadre of potential future investigators. Nevertheless, beyond associations within their individual laboratories and occasional contacts at NSBRI retreats or meetings of professional societies such as the Aerospace Medical Association (ASMA), the American Institute of Aeronautics and Astronautics (AIAA), and the American Society for Gravitation and Space Biology (ASGSB), they did not form a cohesive peer group. Most of those students receive their graduate degrees in traditional, single-discipline departments. Although integrating engineering and the biomedical sciences is essential to the design and conduct of long-duration missions in the hostile environment of space, these students generally do not receive the broad training in the engineering and life science disciplines that such integration will require. Normally they received no sustained experience at NASA, or with its contractors developing associated hardware. Not surprisingly, only a fraction of these future researchers remained in the aerospace field after graduation.

Under a grant from the National Space Biomedical Research Institute, we have developed an interdisciplinary graduate training program in bioastronautics that can meet the needs and ambitions of these students and others, and thereby begin to reverse the growing workforce deficit, as perceived at NASA and the aerospace industry. The program combines the biomedical and engineering disciplines of the Harvard-MIT Division of Health Sciences and Technology's (HST) long-standing doctoral program in Medical Engineering and Medical Physics (MEMPH) with specialized coursework in bioastronautics and hands-on experience in the human space flight arena.

Graduates of this program are well-qualified engineers or physical scientists with extensive knowledge of the medical sciences and specific training in the area of bioastronautics. They will be able to span disparate problem areas from gravitational biology that range from the cellular level to the level of clinical operations in a Mars exploration mission; from bioinstrumentation and imaging to information technology in telemedicine and behavioral sciences.