The NASA Space Life Sciences Training Program: Accomplishments Since 2013

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Outline

• Introduction
• SLSTP History
• SLSTP at Ames
• SLSTP Process
• Mentor, Staffer, and Student Responsibilities
• 2017 research projects
• Quotes
• Summary and References

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SLSTP History: 1985 to 2005

- Started at **Kennedy Space Center** ~1985
- Six weeks per year
- Up to 40 students participated per year, selected on a competitive basis
- GPA ≥ 3.0, must have expressed interest in life sciences
- Students were provided
  - round trip to and from KSC
  - housing, meal allowance, and transportation
  - research and technology development experience
  - lectures, curriculum, and tours

[https://www.nasa.gov/ames/research/space-life-sciences-training-program](https://www.nasa.gov/ames/research/space-life-sciences-training-program)
• The primary goal of the program is to train the next generation of scientists and engineers, enabling NASA to meet future research and development challenges in the space life sciences.

• Undergraduate students entering their junior or senior years with professional experience in space life science disciplines.

• Ten-week summer internship program (80% research, 20% group activities)

• Students are provided:
  • mentorship from NASA scientists and engineers
  • housing, a $6K stipend, and $500 travel allowance
  • transportation (2 vans driven by staffers) on Center and to offsite locations
  • travel support to ASGSR or other professional conference if abstract is accepted

NASA Funding: Space Biology Project

https://www.nasa.gov/ames/research/space-life-sciences-training-program
SLSTP at Ames: 2013 - 2017

• Restarted SLSTP at **Ames Research Center** in 2013
  • “Pilot program” of 6 students and 1 staffer
  • Increased students and staffers in 2014

• 49 students from 41 different Universities have completed the program to date
• 20 + mentors from Space Biosciences Division

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of female students</th>
<th>Number of male students</th>
<th>Total number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2014</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>2015</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>2016</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>2017</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>20</strong></td>
<td><strong>29</strong></td>
<td><strong>49</strong></td>
</tr>
</tbody>
</table>

**Student Demographics**

<table>
<thead>
<tr>
<th>Student Demographics</th>
<th>% of all student respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>53</td>
</tr>
<tr>
<td>Asian</td>
<td>21</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>11</td>
</tr>
<tr>
<td>Black or African American</td>
<td>5</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
<td>5</td>
</tr>
<tr>
<td>Two or more races</td>
<td>5</td>
</tr>
</tbody>
</table>

[https://www.nasa.gov/ames/research/space-life-sciences-training-program](https://www.nasa.gov/ames/research/space-life-sciences-training-program)
Universities and Colleges

- 49 students from 41 different Universities in 24 U.S. States

- Arizona State University
- Carnegie Mellon University
- Columbia University
- Cornell University
- CUNY City College, New York
- Embry Riddle Aeronautical University
- Georgia Institute of Technology
- Harvard University (2)
- Johns Hopkins University
- Louisiana State University
- Massachusetts Institute of Technology (3)
- Michigan Technological University
- Mitchell Community College
- Oakland University
- Pacific University
- Pomona College
- Purdue University
- San Jose State University (2)
- Stony Brook University
- Temple University
- University of Alabama
- University of Arizona
- University of California Berkeley (4)
- University of California Davis
- University of California San Diego
- University of California Santa Barbara (2)
- University of California Santa Cruz
- University of California Los Angeles
- University of Chicago
- University of Colorado Denver
- University of Houston
- University of Kentucky
- University of Maine
- University of Maryland College Park
- University of Minnesota Twin Cities
- University of Missouri-Columbia
- University of Nebraska
- University of Pennsylvania
- Washington University
- Wesley College
- Yale University

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“Having the honor to participate in NASA’s Space Life Sciences Training Program was a great experience and a remarkable milestone in my life. Working at NASA has always been a distant dream of mine. It wasn’t until I learned about this program that I found the courage to peruse that dream and make it a reality. The knowledge and experiences gained from this program will reign throughout my life forever.”

“I am very happy with my time in SLSTP. This program taught me a lot not only about myself as a scientist, but also as a person and what I can bring to the table…”

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Mentors
• Provide research project, select the student, provide mentorship, and accommodate student in lab/office for 10 weeks.

Staffers
• ~50% of their time on SLSTP student management, 50% research
• Draft profile books, coordinate speakers, communicate with management
• Drive students from place to place, guide students

Students
• Live in NASA Ames housing, participate in team building
• Support mentors by performing research tasks related to project description (~80% of their time)
• Group project and group activities (during week, evenings, and on weekends) (~20% of their time)
  • Weekly summaries, lightning talks, mid-term, and final presentations
  • Presentations to NASA HQ
• Final Paper and Testimonial describing summer experience
• Submit abstracts to ASGSR

**If accepted, students attend ASGSR Conference!!**

https://www.nasa.gov/ames/research/space-life-sciences-training-program
<table>
<thead>
<tr>
<th>Project</th>
<th>Mentor</th>
<th>Org Code</th>
<th>Student</th>
<th>University</th>
<th>Major</th>
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</thead>
<tbody>
<tr>
<td>Hypergravity exacerbates endoplasmic reticulum (ER) stress in Drosophila melanogaster: an evaluation of countermeasures</td>
<td>Sharmila Bhattacharya</td>
<td>SCR</td>
<td>Andrew Pelos</td>
<td>Pomona College</td>
<td>Molecular Biology</td>
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<tr>
<td>Studies in Bone Biology and Biomechanics</td>
<td>Josh Alwood</td>
<td>SCR</td>
<td>Ame Johnson</td>
<td>University of Colorado Denver</td>
<td>Public Health</td>
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<td>Exposing Microorganisms in the Stratosphere (E-MIST)</td>
<td>David Smith</td>
<td>SCR</td>
<td>Tristan Caro</td>
<td>University of California Berkeley</td>
<td>Cellular Biology</td>
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<tr>
<td>Development &amp; testing of radiation biosensors for NASA's BioSentinel mission</td>
<td>Sergio Santa Maria (Sharmila Bhattacharya)</td>
<td>SCR</td>
<td>Sawan Dalal</td>
<td>University of Houston</td>
<td>Biology</td>
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<tr>
<td>Skeletal responses to long-duration simulated weightlessness</td>
<td>Ruth Globus</td>
<td>SCR</td>
<td>Julia Adams</td>
<td>University of California Santa Barbara</td>
<td>Microbiology</td>
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<tr>
<td>Candidate nutritional countermeasure to mitigate adverse effects of spaceflight</td>
<td>Ann-Sofie Schreurs (Ruth Globus)</td>
<td>SCR</td>
<td>Ons M'Saad</td>
<td>Massachusetts Institute of Technology</td>
<td>Bioengineering</td>
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<tr>
<td>The Influence of Mechanical Unloading on Stem Cell-Based Tissue Regeneration</td>
<td>Elizabeth Blaber (Eduardo Almeida)</td>
<td>SCR</td>
<td>Esther Putman</td>
<td>University of Kentucky</td>
<td>Neuroscience and Biology</td>
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<tr>
<td>GeneLab Data Curation and Analysis</td>
<td>Homer Fogle (Sylvain Costes)</td>
<td>SCR</td>
<td>Maya Ramachandran</td>
<td>Columbia University</td>
<td>Biology</td>
</tr>
<tr>
<td>Synthetic biology for solar system exploration: How do microbes respond to spaceflight and how can we utilize them for in situ manufacturing?</td>
<td>Jonathan Galazka</td>
<td>SCR</td>
<td>Lily Neff</td>
<td>Wesley College</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Epigenetic Mechanisms and Sex Differences in Prenatal Programming of Adult Brain, Physiology and Behavior</td>
<td>April Ronca</td>
<td>SCR</td>
<td>Sophie Benson</td>
<td>Harvard University</td>
<td>Human Biology</td>
</tr>
<tr>
<td>Staffer</td>
<td>John Hogan</td>
<td>SCB</td>
<td>Joseph (Niko) Vlastos</td>
<td>Arizona State University</td>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>Staffer</td>
<td>Rusty Hung, Uland Wong, (Terry Fong)</td>
<td>TI</td>
<td>Onalli Gunasekara</td>
<td>University of California, Irvine</td>
<td>Aerospace Engineering</td>
</tr>
</tbody>
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Summary

- SLSTP has been successfully run for 5 years at Ames
- 20+ mentors have trained 49 students in space life sciences disciplines and NASA culture
- Supported advancement of Space Biology research and technology development efforts
- Inspired mentors and managers
- ~30% of students are coauthors on manuscripts that are in process or will be published
- ~35% of students are now in graduate school
- 2 SLSTP alums are currently employed at a NASA center
- Expanded student involvement in ASGSR
- Students emphasize their experience is challenging, rewarding, inspiring life changing, career defining one that fosters great friendships excellent for networking an outstanding team building and leadership opportunity
- Interested in exploring the possibility of expanding SLSTP to include other centers

Funding from the Space Biology Project is gratefully acknowledged.

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References


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