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
- 2019 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 $\geq 3.0$, 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
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
- stipend, housing covered by NASA
- 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 - 2019
SLSTP at Ames: 2013 - 2019

- Restarted SLSTP at **Ames Research Center** in 2013
  - “Pilot program” of 6 students and 1 staffer
- 71 students from 53 different Universities have completed the program to date
- 29 mentors from Space Biosciences Division
- 13 staffers

<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>
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<tr>
<td>2015</td>
<td>4</td>
<td>6</td>
<td>10</td>
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<tr>
<td>2016</td>
<td>4</td>
<td>7</td>
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<td>2017</td>
<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>2018</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>2019</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Totals</td>
<td>36</td>
<td>35</td>
<td>71</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student Demographics</th>
<th>% of all student respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>52</td>
</tr>
<tr>
<td>Asian</td>
<td>28</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>10</td>
</tr>
<tr>
<td>Black or African American</td>
<td>2</td>
</tr>
<tr>
<td>American Indian or Alaskan Native</td>
<td>3</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
Universities and Colleges

- 71 students from 52 different Universities in 27 U.S. states

Arizona State University (3)
Binghamton
Carnegie Mellon University
Columbia University
Cornell University
CUNY City College, New York
Embry Riddle Aeronautical University (2)
Florida State University
Georgia Institute of Technology
Harvard University (2)
Johns Hopkins University
Kent State University
Louisiana State University
Massachusetts Institute of Technology (3)
Michigan Technological University
Mitchell Community College
Oakland University (2)
Pacific University
Point Loma Nazarene University
Pomona College (2)
Purdue University
San Diego State University
San Jose State University (3)
Santa Clara University
Stony Brook University
Temple University
Tufts University

University of Alabama
University of Arizona
University of California Berkeley (5)
University of California Davis
University of California San Diego (2)
University of San Francisco
University of California Santa Barbara (2)
University of California Santa Cruz
University of California Los Angeles
University of Chicago
University of Colorado Boulder
University of Colorado Denver
University of Houston
University of Kentucky
University of Maine
University of Maryland College Park (2)
University of Minnesota Twin Cities
University of Missouri-Columbia
University of Nebraska
University of New Mexico
University of Pennsylvania (2)
University of Utah
Washington University
Wesley College
Yale University (2)

https://www.nasa.gov/ames/research/space-life-sciences-training-program
SLSTP Process

• SLSTP solicits for project descriptions from prospective mentors in the Space Biosciences Division (Expected in late November 2019)

• Project descriptions are selected and posted to [https://www.slstpapp.com/](https://www.slstpapp.com/)
  • Application window opens December / January (Closes ~January /February)
  • Prospective students that apply to be a research associate for a project description must:
    - be a US citizen
    - be in high academic standing (GPA of 3.2 or greater)
    - have a minimum age of 18
    - be a junior or senior undergraduate student or 1st year graduate student next fall
    - have a passion for space and a desire to study space life science

• Student Selection:
  • Applications are scored based on written responses, experience, recommendation letters
  • Management team provides multiple highest scoring student applications to mentor for selection

• Two staffers (student alumni) are hired to manage day-to-day activities

[https://www.nasa.gov/ames/research/space-life-sciences-training-program](https://www.nasa.gov/ames/research/space-life-sciences-training-program)
Mentor, Staffer, and Student Responsibilities

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 have the opportunity to attend the ASGSR Conference!**
<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>Omic and Phenotypic Investigations of Microorganisms Exposed to Extreme Stratospheric Conditions</td>
<td>Samantha Waters</td>
<td>SCR</td>
<td>Bianca Serda</td>
<td>University of New Mexico</td>
<td>Biology</td>
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<tr>
<td>Molecular Basis of Resistance to Radiation Damage in Tardigrades</td>
<td>Sigrid Reinsch</td>
<td>SCR</td>
<td>Ben Cooper</td>
<td>Tufts University</td>
<td>Biology</td>
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<tr>
<td>GeneLab: Data Processing and Analysis</td>
<td>Homer Fogel</td>
<td>SCR</td>
<td>Mikayla Buckley</td>
<td>Florida State University</td>
<td>Computational Biology</td>
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<tr>
<td>Metagenomic Sample Processing and Analysis for the GeneLab Project</td>
<td>Valery Boyko</td>
<td>SCR</td>
<td>Taylor Walton</td>
<td>Arizona State University</td>
<td>Biochemistry</td>
</tr>
<tr>
<td>Microbial Factories for Solar System Exploration</td>
<td>John Hogan</td>
<td>SCB</td>
<td>Ava Karanjia</td>
<td>Arizona State University</td>
<td>Microbiology / Chemical Engineering</td>
</tr>
<tr>
<td>Development and Testing of Biological Sensors for Deep Space Exploration</td>
<td>Sergio Santa Maria</td>
<td>SCR</td>
<td>Elizabeth Hawkins</td>
<td>University of Maryland</td>
<td>Biochemistry and Molecular Biology</td>
</tr>
<tr>
<td>WetLab-2 Automation</td>
<td>Macarena Parra</td>
<td>SCR</td>
<td>Gurkaran Singh</td>
<td>Pomona College</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>Screening Putative Countermeasures for Altered Gravity Using the Hypergravity Paradigm</td>
<td>S. Bhattacharya / S. Mhatre / J. Iyer</td>
<td>SCR</td>
<td>Timothy Wiegman</td>
<td>Point Loma Nazarene University</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>Pathogenesis of Microbes in Simulated Microgravity</td>
<td>S. Bhattacharya / R. Gilbert</td>
<td>SCR</td>
<td>Nicole Tannenbaum</td>
<td>University of Pennsylvania</td>
<td>Cellular and Molecular Biology</td>
</tr>
<tr>
<td>The Stress-Inducible Heat Shock Program in Altered Gravity and its Role in Immunity</td>
<td>Amber Paul</td>
<td>SCR</td>
<td>Joe Olivieri</td>
<td>San Diego State University</td>
<td>Biology</td>
</tr>
<tr>
<td>Staffer</td>
<td>David Smith / Samantha Waters</td>
<td>SCR</td>
<td>Jordan McKaig</td>
<td>University of Michigan</td>
<td>Biology</td>
</tr>
<tr>
<td>Staffer</td>
<td>Macarena Parra</td>
<td>SCR</td>
<td>Elizabeth Talburt</td>
<td>Embry-Riddle Aeronautical University</td>
<td>Engineering / Bioengineering</td>
</tr>
</tbody>
</table>
“SLSTP was an experience that I will never forget. My summer at NASA Ames has undoubtedly changed my life and career trajectory for the better.”

“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…”

“This program is intense, unique and exciting!”

“This internship experience greatly exceeded all of my expectations.”

“Thank you SLSTP, for this incredibly rewarding experience. I am so lucky…and it still blows my mind that I interned for NASA!”

https://www.nasa.gov/ames/research/space-life-sciences-training-program
Summary

- SLSTP has been successfully run for 7 years at Ames
- 25+ mentors have trained 71 students in space life sciences disciplines and NASA culture
- Supported advancement of Space Biology research and technology development efforts
- Inspired mentors and managers
- Students are coauthors on manuscripts
- Many students have gone to graduate or medical school
- Alums have been employed at a NASA or other government 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.

https://www.nasa.gov/ames/research/space-life-sciences-training-program
References


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