CaSGC Partnerships with MESA for Community College University Lab Research Experiences

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Assistant Director
California Space Grant Consortium
October 10, 2014
PRESENTATION OVERVIEW

- California Space Grant Affiliates & Partners
- Goals for Community College Pilot Project
- Program Partners
- MESA Program
- Pilot: “San Diego MESA Alliance Research Academy”
- Alignment with Co-STEM, NASA, Research in STEM Retention
- Permanent Program, Growth, Impact
CASGC AFFILIATES & PARTNERS

• 28 Affiliate Institutions
• 16 Community College Partners
• 3 NASA Centers

**Lead Institution:**
UCSD: University of California, San Diego

**Affiliate Members:**
APU: Azusa Pacific University
ASP: Astronomical Society of the Pacific
CTT: California Institute of Technology
CPP: California Polytechnic University, Pomona
CPS: California State Polytechnic University, San Luis Obispo
CS: California State University, Fresno
CS: California State University, Los Angeles
CSULB: California State University Long Beach
CSUS: California State University, Sacramento
CSUSB: California State University, San Bernardino
PC: Pomona College
SCU: Santa Clara University
SDCC: San Diego City College
SDSC: San Diego Supercomputer Center
SDSU: San Diego State University
SJ: San Jose State University
SJSU: San Jose State University
Sonoma State University
SU: Stanford University
UCB: University of California, Berkeley
UCD: University of California, Davis
UCLA: University of California, Los Angeles
UCR: University of California, Riverside
UCSB: University of California, Santa Barbara
UCSC: University of California, Santa Cruz
USC: University of Southern California
USD: University of San Diego

**Community College Partners:**
CC: Citrus College
CC: Cabrillo College
CSE: City College of San Francisco
COD: College of the Desert
CSM: College of San Mateo
ELAC: East Los Angeles College
GC: Gavilan College
HC: Hartnell College
LACC: Los Angeles City College
MSAC: Mt. San Antonio College
NVC: Napa Valley College
PCC: Pasadena City College
RHC: Rio Hondo College
SAC: Santa Ana College
SBCC: Santa Barbara City College
SC: Southwestern College

**California NASA Center Partners:**
AMES: NASA Ames Research Center
ARMSTRONG: NASA Armstrong Flight Research Center
JPL: NASA/Jet Propulsion Laboratory
CASGC AFFILIATES & PARTNERS

Bay Area Affiliate Mtg
NASA Ames
March 2014

Southern CA Affiliate Mtg
UC Los Angeles
April 2014
CASGC AFFILIATES & PARTNERS

- Programs include graduate and undergraduate research and team projects in: Aeronautics...
CASGC AFFILIATES & PARTNERS

- Astronautics...
CASGC AFFILIATES & PARTNERS

- Space & Physical Sciences...
CASGC AFFILIATES & PARTNERS

- Astronomy & Astrophysics...
Western Regional Space Grant Meeting

Earth & Environmental Sciences...
CASGC AFFILIATES & PARTNERS

- Precollege...
CASGC AFFILIATES & PARTNERS

▪...And Public Outreach...
## Reaching:

<table>
<thead>
<tr>
<th>Program Element</th>
<th>Number of Direct Participants (Funded &amp; Non-Funded Students)</th>
<th>Number of Direct Funded Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fellowships &amp; Scholarships</td>
<td>194</td>
<td>159</td>
</tr>
<tr>
<td>Higher Education</td>
<td>234</td>
<td>113</td>
</tr>
<tr>
<td>Research Infrastructure</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td><strong>TOTAL OUTCOME 1</strong></td>
<td><strong>451 students</strong></td>
<td><strong>293 students</strong></td>
</tr>
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</table>
GOALS FOR COMMUNITY COLLEGE PILOT PROJECT

- Responding to NASA Office of Education priorities: Working with more community colleges, Minority Serving Institutions
- Increasing diversity & inclusion in our programs
- Providing university research experience to community college students for increased STEM retention and advanced STEM degrees
PROGRAM PARTNERS
Cooperative program between:

• California Space Grant
• UC San Diego
• San Diego MESA Alliance
• San Diego State University
• San Diego City College
• Southwestern College
MESA PROGRAM (MATHEMATICS, ENGINEERING, SCIENCE, ACHIEVEMENT)

- Engages educationally disadvantaged students. Most are:
  - First in family to go to college
  - Low-income
  - Attended low-performing schools with few resources

- Three Segments (Together Making A Pipeline):
  - MESA Schools Program
  - MESA Community College Program
  - MESA Engineering Program

- Emphasis on rigorous academics, supportive communities for academic success, industry collaboration, preparing students to transfer to university for higher STEM studies.

Synergy between MESA and Space Grant
MESA PROGRAMS

- Arizona
- Colorado
- Hawaii
- Illinois
- Maryland
- New Mexico
- Oregon
- Pennsylvania
- Utah
- Washington

mesausa.org
MESA PROGRAM—CALIFORNIA

San Diego MESA Alliance

1. Chula Vista: Southwestern College, Chula Vista (MCCP)
2. Orange: Chapman University/UC Irvine (MSP)
3. Palm Desert: College of the Desert, Palm Desert (MCCP)
4. Riverside: UC Riverside (MEP)
5. Riverside: UC Riverside (MSP)
6. San Diego: San Diego City College (MCCP)
7. San Diego: CSU San Diego (MEP)
8. San Diego: CSU San Diego (MSP)
9. San Diego: CSU San Diego, Imperial Valley (MSP)
10. Santa Ana: Santa Ana College (MCCP)
11. Ventura: Ventura College (MCCP)
PILOT: “SAN DIEGO MESA ALLIANCE RESEARCH ACADEMY”
PILOT PROGRAM COMPONENTS

- 5 research projects
- 5 graduate student mentors
- 2 community colleges
- 10 students per college
- Criteria:
  - Academic Achievement
  - Participation in Academic Success Workshops
  - Participation in MESA Center activities
  - Positive Attitude & Hard Working
PILOT PROGRAM COMPONENTS

• Learning What is Research
• Developing literature survey skills
• Exploring theoretical & experimental methods
• Placed into groups of 4 students per project
• Preparing presentations on their research
• Presenting research in symposium
• Presenting to Community College peers
• Presenting to K-12
• Multiplier Effect
• Subset in year-long REU in Aerospace
PILOT PROGRAM COMPONENTS

- **Research Projects:**
  1. High Altitude Balloon Project
  2. Aircraft Wing Structural Dynamics
  3. Mixing & Flow Control in High Speed Combustors
  4. Sensorimotor Prosthetic Hand (robotics)
  5. Dynamics of Flame Spread in Microgravity
PILOT PROGRAM—HANDS-ON RESEARCH PROJECTS
PILOT PROGRAM—HANDS-ON RESEARCH PROJECTS
PILOT PROGRAM—PRESENTATIONS
PILOT PROGRAM

San Diego MESA Alliance Research Academy: Summer 2012
<table>
<thead>
<tr>
<th>Experience Level: 0 = novice, 5 = expert</th>
<th>Pre</th>
<th>Post</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature Survey Knowledge - Do you have experience with finding articles in library and using database search?</td>
<td>3.10</td>
<td>3.45</td>
<td>0.35</td>
</tr>
<tr>
<td>Scientific Method - Do you have experience with making hypotheses, testing hypotheses, and making conclusions?</td>
<td>2.55</td>
<td>3.60</td>
<td>1.05</td>
</tr>
<tr>
<td>Team Work Skills - Do you have experience with working in a group?</td>
<td>3.80</td>
<td>4.30</td>
<td>0.50</td>
</tr>
<tr>
<td>Time Management Skills - Do you have experience with planning and meeting deadlines with multiple tasks?</td>
<td>3.80</td>
<td>3.85</td>
<td>0.05</td>
</tr>
<tr>
<td>Presentation Skills - Do you have experience with presenting technical information?</td>
<td>3.25</td>
<td>3.90</td>
<td>0.65</td>
</tr>
<tr>
<td>Experimental Analysis - Do you have experience with measuring, analyzing, and interpreting data?</td>
<td>2.55</td>
<td>3.85</td>
<td>1.30</td>
</tr>
<tr>
<td>Design and Manufacturing - Do you have experience with using CAD and/or building things?</td>
<td>1.30</td>
<td>2.60</td>
<td>1.30</td>
</tr>
</tbody>
</table>
The opportunity I was given to participate in the 2012 Summer Research Academy at San Diego State University (SDSU) was phenomenal. Prior to taking part in the Research Academy I had no knowledge of the importance of how becoming involved in research opportunities can open doors for the future...Conyers Nelson

The Research Academy introduced me to research and the process and environment it occurs under. I am more directed in my studies because I know what the knowledge will be used for. I am now absolutely certain of my major and feel prepared to undertake the tasks and accomplish the goals that lie ahead...Alejandro Levesque
ALIGNMENT WITH:

- **Co-STEM Priority Areas 3 and 4:**
  - Enhance the STEM Experience of Undergraduate Students
  - Better Serve Groups Historically Underrepresented in STEM

- **NASA Education Lines of Business**
  - STEM Engagement
  - NASA Internships, Fellowships, and Scholarships (NIFS)

- **NASA Space Grant Objectives:**
  - Cooperative Programs
  - Interdisciplinary Training
  - Recruit & Train U.S. Citizens—Underrepresented Minorities
ALIGNMENT WITH RESEARCH ON STEM RETENTION FOR COMMUNITY COLLEGE STUDENTS

- Hands-On Research Experiences
- Academic Success Workshops
- Student Cohort

**Decision to continue this program...**
PERMANENT PROGRAM

San Diego MESA Alliance Research Academy: Summer 2013
PERMANENT PROGRAM

San Diego MESA Alliance Research Academy: Summer 2014 (Year 3)
GROWTH

- RFP Released
- Introduce to other parts of CA
- Selected two proposals
- Ran Spring and Summer 2014
LOS ANGELES: SOLAR ENERGY & PLANETARY EXPLORATION
## SUMMARY

<table>
<thead>
<tr>
<th>Program</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot SDMA Program</td>
<td>Summer 2012</td>
</tr>
<tr>
<td>Permanent SDMA Program</td>
<td>Summer 2013 &amp; 2014</td>
</tr>
<tr>
<td>Spin-Offs</td>
<td>Orange County &amp; Los Angeles 2014</td>
</tr>
</tbody>
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### Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Count/Percentage</th>
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<tbody>
<tr>
<td>101 Students</td>
<td></td>
</tr>
<tr>
<td>86% Underrepresented</td>
<td></td>
</tr>
<tr>
<td>93% First to Graduate College</td>
<td></td>
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<tr>
<td>66% Subsidized Lunch</td>
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# Partners

<table>
<thead>
<tr>
<th>Community Colleges:</th>
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<tbody>
<tr>
<td>San Diego</td>
<td>San Diego City College (MSI)</td>
</tr>
<tr>
<td>San Diego</td>
<td>Southwestern College (MSI)</td>
</tr>
<tr>
<td>Orange County</td>
<td>Santa Ana College (MSI)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Los Angeles City College (MSI)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Pasadena City College (MSI)</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>Rio Hondo College (MSI)</td>
</tr>
<tr>
<td>Universities:</td>
<td></td>
</tr>
<tr>
<td>San Diego</td>
<td>San Diego State University (MSI)</td>
</tr>
<tr>
<td>Orange County</td>
<td>Chapman University</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>CSU Los Angeles (MSI)</td>
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**IMPACT**

<table>
<thead>
<tr>
<th>Longitudinal Tracking</th>
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<tbody>
<tr>
<td>All are still students (too soon to graduate and join workforce)</td>
</tr>
<tr>
<td>All are studying STEM</td>
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<tr>
<td>Several have graduated and transferred to university for advanced STEM degrees</td>
</tr>
<tr>
<td>Their feedback was extremely positive on how the program benefited them</td>
</tr>
<tr>
<td>Students are inspired and prepared to participate in research and continue studying in STEM fields</td>
</tr>
<tr>
<td>Students share their experience with the broader community (STEM ambassadors)</td>
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</tbody>
</table>
RECENT FEEDBACK

“Doing this program helped me see the bigger picture of why I am learning what I am learning. I was able to apply what I was learning to real life situations and not just reading it in a book. It motivated me to keep going and eventually, I would be able to put my knowledge in use.”

“Yes! I am a junior transfer student at UCI and am pursuing a degree in the STEM field and am seeking to obtain a graduate level degree in the field. The experience itself was a great opportunity that enabled me to expand my horizons and that is why I am deeply thankful! “

“Yes, I am using the information I learned on the projects we worked on to use with younger students to inspire them to pursue science as a future profession.”

“It has definitely helped my pursuit of an engineering degree. It solidified several ideas regarding electricity, helped me improve my hands on skills, and showed me how to create formal lab reports.”
PLANS

- Continue San Diego MESA Alliance Research Academy and track students’ progress
- Solicit additional Community College-University Lab Research proposals through the MCCP