

**PaSCoR** ... *from Space*

# The Undergraduate Research and Mentoring Experience

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Ponce Hilton



Adapted in part from the UTEP  
Affinity Group Model



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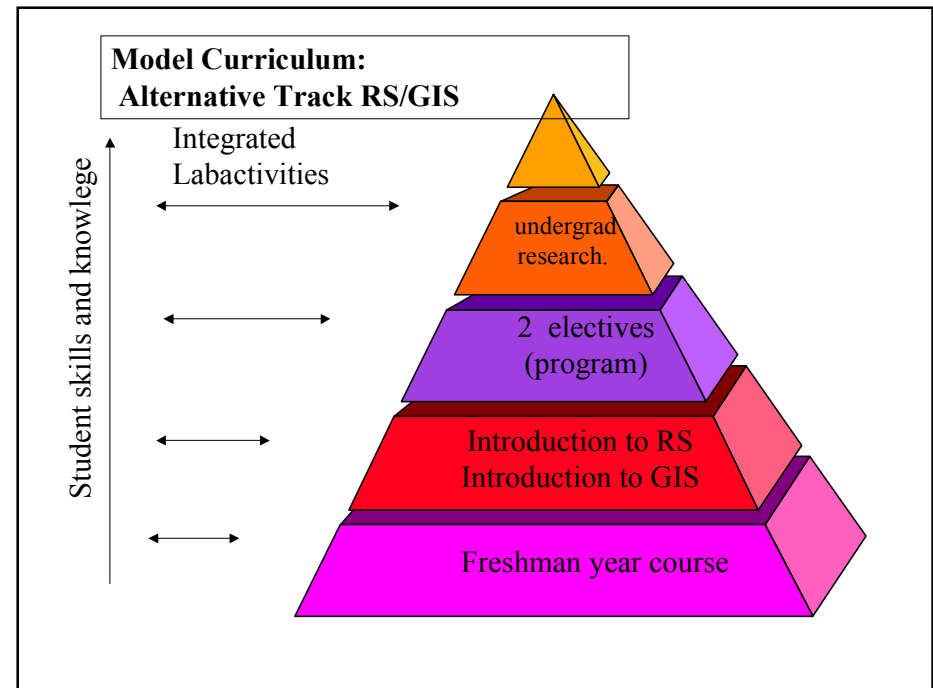
## Agenda

- The PaSCoR Process
- Research objectives and The process
- Exercise I: Challenges
- The creation of a research team
- Exercise II: The mentor
- Mentoring is a personal relationship
- The Affinity group model
- Exercise III: The Affinity group model
- Exercise IV: The PaSCoR affinity research group model



# The NASA PaSCoR Project

- Two main goals:
  - Curriculum Development
  - Undergraduate Research & Student Mentoring



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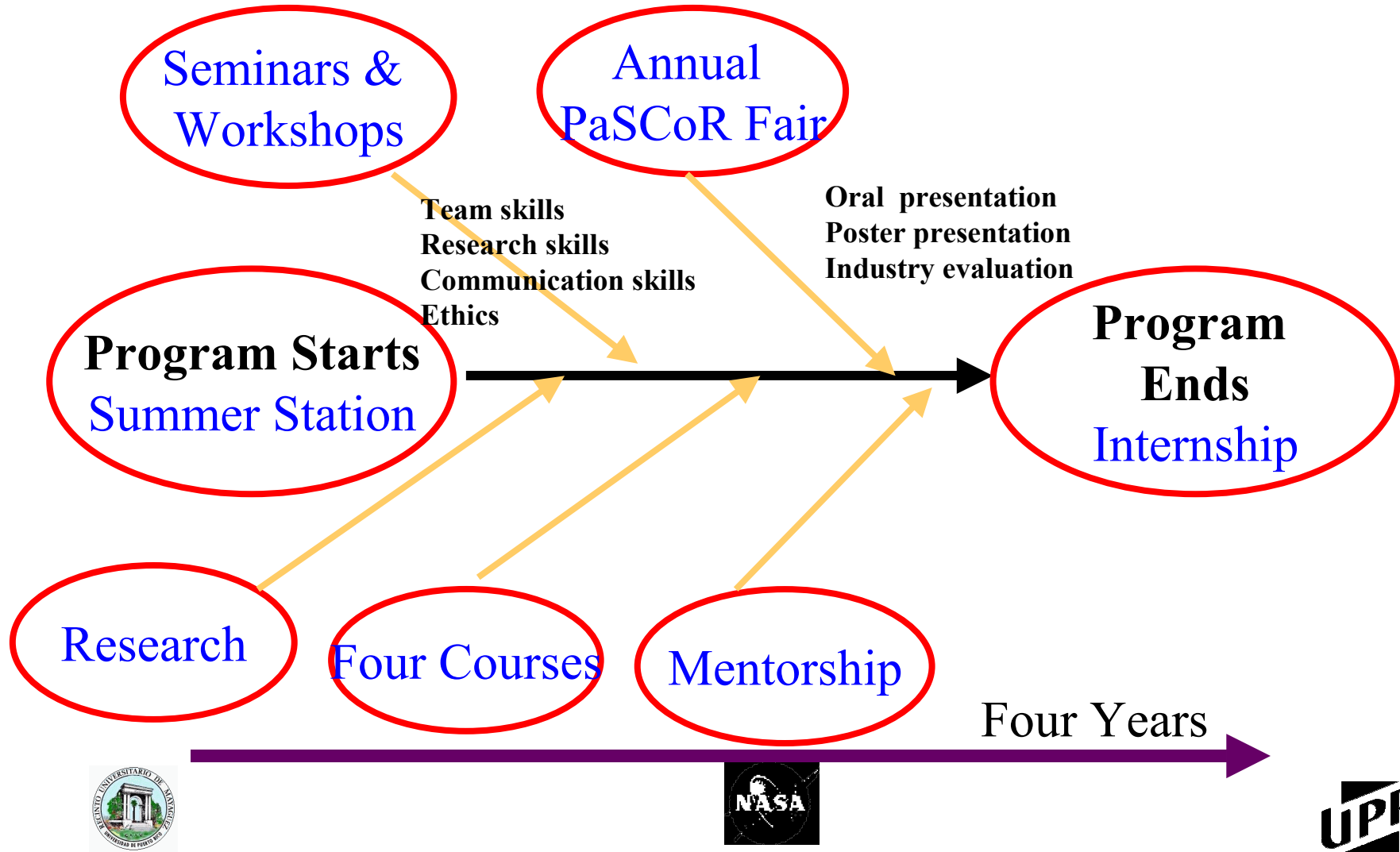
## Undergraduate Research Student Progress

YEAR/ACTIVITIES	YEAR 1	YEAR 2	YEAR 3	YEAR 4
<b>Recruitment &amp; Curriculum</b>	<ol style="list-style-type: none"> <li>Awareness (1) (Univ 101, other)</li> <li>Selection of 35 students (1)</li> <li>Mentor Assignment (1)</li> <li>Seminars &amp; Workshops (2)</li> </ol>	PaSCoR Courses <ul style="list-style-type: none"> <li>Int. to RS (1)</li> <li>Int. to GIS (2)</li> </ul>	PaSCoR Courses <ul style="list-style-type: none"> <li>Advanced courses in SMET disciplines: Geology, Math, Agricultural Sciences, ECE</li> </ul>	
<b>Undergraduate Research</b>	<ul style="list-style-type: none"> <li>Summer Station Workshop (2)</li> </ul>	<ul style="list-style-type: none"> <li>Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</li> </ul>	<ul style="list-style-type: none"> <li>Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</li> <li>Selection of 5 students for Summer Internships</li> </ul>	<ul style="list-style-type: none"> <li>Undergraduate Research with mentor in a team (advanced undergraduate students &amp; faculty)</li> </ul>
<b>Outreach</b>	Technical Presentations in local, national & international forums (e.g., Junior Tech Meeting, CRC, ADMI, Annual PaSCoR Fair)	<ul style="list-style-type: none"> <li>Technical Presentations in local, national &amp; international forums (e.g., Junior Tech Meeting, CRC, ADMI, Annual PaSCoR Fair)</li> </ul>	<ul style="list-style-type: none"> <li>Technical Presentations in local, national &amp; international forums (e.g., Junior Tech Meeting, CRC, ADMI, Annual PaSCoR Fair)</li> </ul>	<ul style="list-style-type: none"> <li>Technical Presentations in local, national &amp; international forums (e.g., Junior Tech Meeting, CRC, ADMI, Annual PaSCoR Fair)</li> <li>Submission of Paper for Publication</li> <li>PaSCoR Research Presentation</li> <li>RS-GIS Certificate Ceremony</li> </ul>
<b>Student Counseling</b>	Academic & Professional Counseling (1,2)	Academic & Professional Counseling (1,2)	Academic & Professional Counseling (1,2)	Academic & Professional Counseling (1,2)



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## The PaSCoR Student "Process"



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## Objectives of the UG Research & Mentoring Experience

- Provide practice-based, hands-on experience integrated to the RS/GIS curriculum
- Attain higher level of competence in SMET programs
- Understand scientific & research methodology
- Help students make informed judgments about scientific & technical matters
- Develop teamwork & communication skills
- Motivate students to pursue graduate studies



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## Exercise I



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What challenges exist to effectively implement the UG Research & Mentoring Experience?

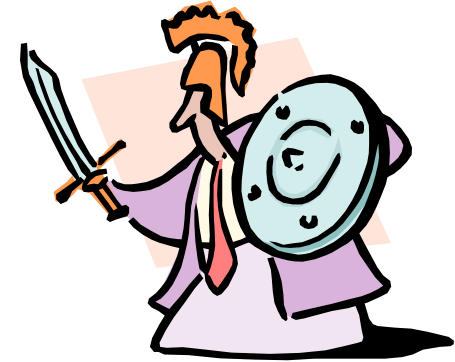
- Make a list of 5 factors



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## Challenges

- Lack of domain expertise
  - Knowledge & skills
- Time investment
- Requires continuous commitment to tasks
- Setting clear, realistic goals
- Recruitment of competent but not so confident students
- Other?



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# Steps to integrate students in a research team



- Identify potential students (freshman +) **when & who??**
  - UNIV 101
  - Recruitment meetings
  - Complete form
- Select 45 students **when & who ??**
- Summer Station Workshop



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# Steps to integrate students in a research team



- Assign students to affinity research group (mentor & team) **when & who??**
- Mentor year-round by faculty
- Advanced undergraduates
  - 2 semester research stipend
  - Paid Summer internship



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## Exercise II



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Identify a mentor in  
your career.



- List his/her characteristics, attributes and attitudes.
- Describe mentoring activities & interaction



# Affinity Research Group Model

Research & Technical Skills

Teamwork &  
Communication Skills

**Increase retention**  
**Increase student research**  
**Facilitate student research**

Mentors/Role Models

Goals

Faculty-Student Interaction

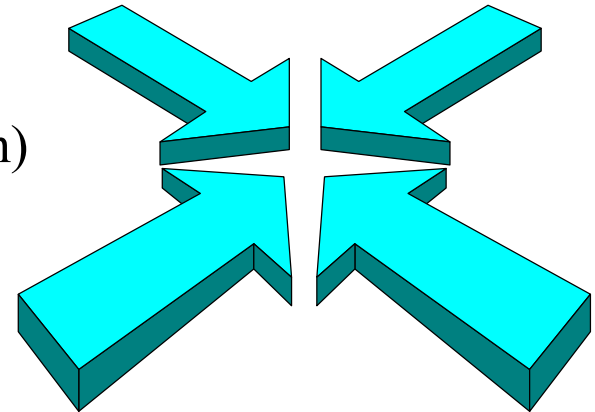


Adapted from UTEP's Affinity Model



# Affinity Group Model Components

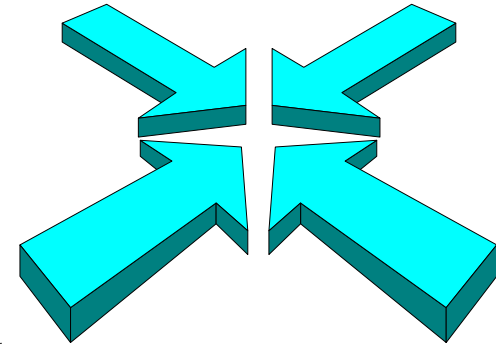
- Orientation
- Training
  - Skills (e.g., teamwork, communication)
  - RS/GIS technical areas
- Research project framework
- Define expectations & variables
- Weekly meetings
- Monthly meetings
- Poster/paper presentations
- Other?



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## Orientation

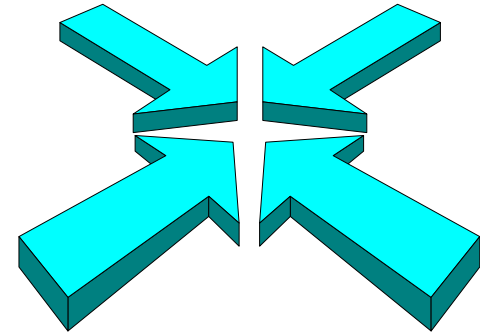
- Purpose
  - Facilitate assimilation of new students
    - Philosophy & goals
  - Increase ownership of research
- Benefits
  - Understand basic/group research skills
    - Scientific methodology
    - Ethics
    - Cooperative group skills
    - Competing concerns



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## Training

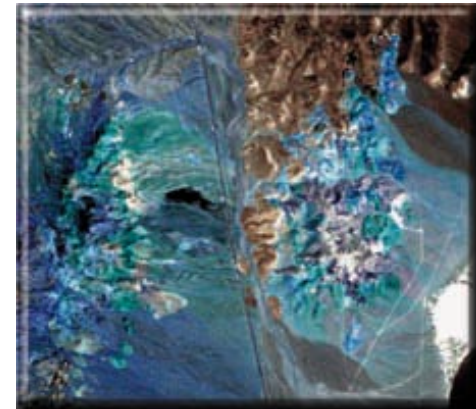
- Purpose
  - Provide technical & soft skills development
- Benefits
  - Accelerate RS/GIS training
  - Accelerate integration into research group



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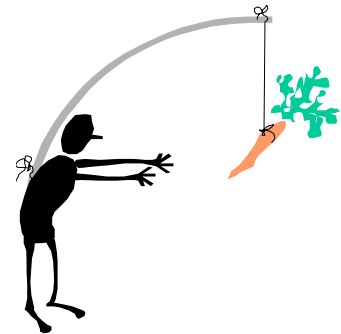
## Research Project Framework

- Purpose
  - To provide a framework in which the students can realize the relevance of their assignments
- Description
  - Define mission & goals
  - Map tasks to goals
  - Define activities & timeline
  - Promote project & time management
- Benefits
  - Understand the importance of work
  - Understand the steps toward completing tasks
  - Facilitate setting goals & balancing time



## Define Expectations & Variables

- Purpose
  - To define milestones for the project
- Description
  - Associate deliverable with assigned task
  - Provide constructive criticism of deliverable
  - Examples; presentation, critical review, summary, literature review
- Benefits
  - Develop domain expertise
  - Sharpen technical & communication skills
  - Contribute tangibly to project
  - Structures individual accountability
  - Track progress



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## Weekly Meetings



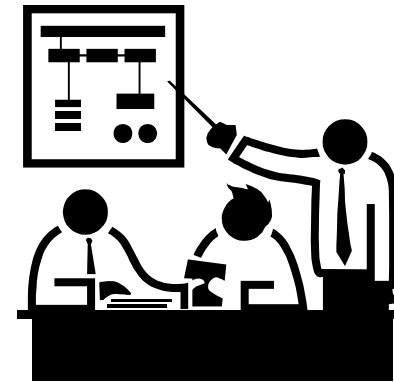
- Purpose
  - To report progress, promote refinement of weekly goals, solve problems & discuss research
- Benefits
  - Promote positive interaction
  - Structure individual accountability
  - Practice team & communication skills
  - Develop domain expertise skills
  - Evaluate goals, tasks & methodology



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## Monthly Meetings

- Purpose
  - To integrate research results, bring students together & develop higher-level thinking skills
- Description
  - Recognize students
  - Inform team of research
  - Teach & practice higher-level skills
- Benefits
  - Foster cooperation
  - Transfer results
  - Develop domain expertise
  - Practice skills



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## Exercise III



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## Area importance assessment

1 = low >>>→ 5 = high

- Orientation
- Training  
  - Teamwork, communication skills
  - RS/GIS technical areas
- Research project framework
- Define expectations & variables
- Weekly meetings
- Monthly meetings
- Poster/paper presentations
- Other \_\_\_\_\_



## Researcher Profile

- Research area (keywords)
- Current research projects (grant source)
  1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_



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## Researcher Profile...

Students in UG Research

NAME

TASK

TITLE OF PROJECT



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## Current mentoring activities



- Describe *your mentoring mission or* your current mentoring activities...



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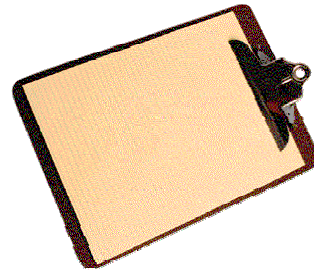
## Future research projects

- Make a list of possible UG Research projects



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## Task



- Orientation
- Training
  - Teamwork, communication skills
  - RS/GIS technical areas
- Research project framework
- Define expectations & variables
- Weekly meetings
- Monthly meetings
- Poster/paper presentations
- Other \_\_\_\_\_

## Responsibility

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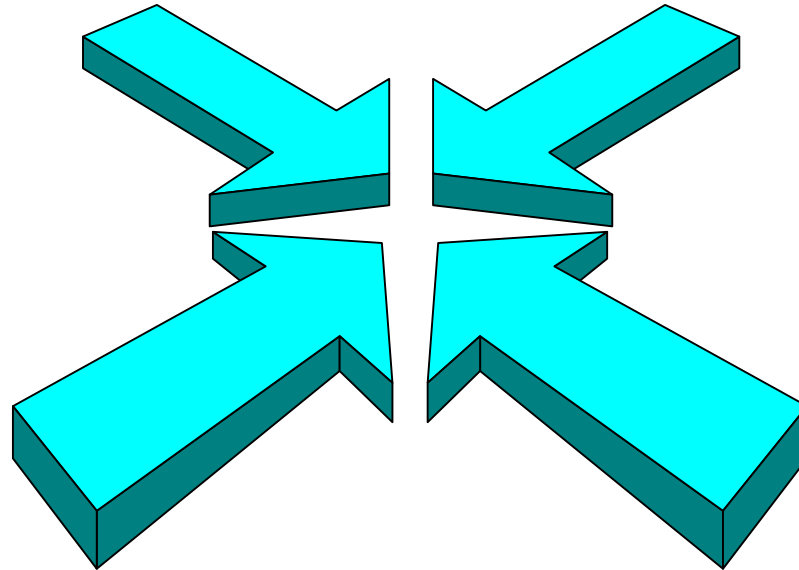
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## Exercise IV



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# Our Own PaSCoR Affinity Research Group Model?



Adapted from UTEP's Affinity Model



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