MAP: STUDENT RESEARCH

Inputs	Strategies	Outputs	Outcomes		Impacts
			(Short Term-Learning)	(Medium Term-Action)	(Long Term-Conditions)
1. Funds from HHMI 2. Matching funds from TTU • Financial support for Scholars • Travel support for Scholars • Research space • Existing expertise for mentoring and teaching in the lab from various lab members • Research presentation training	1, 2. Mentoring of Scholars by experienced, faculty researchers and post-docs, technicians Scholars attend workshops, seminars and various program events (developing a research plan, hypothesis development and testing) Facilitate career planning Annual Research Conference Program and mentor-supported research meeting attendance	1, 2. Better prepared Scholars with first-hand experience in doing research Professional and academic development of Scholars Writing research papers for their lab and an annual Scholar report Public oral presentations Participation in writing manuscripts Senior scholar mentor-leaders Document experience in HHMI Annual Report	Science content knowledge and experiences go far beyond what regular courses teach (hypothesis development, hypothesis testing) Valuable collaborative experiences between Scholars, staff and mentors	Scholars compete for and are successful in getting interviews for post-bac opportunities A culture of understanding is developed in the Scholars that bridges science education and research There is an increase in prestige at CISER for the reputation for the Scholars Professional development through presentations at scientific meetings (local, regional, national) Ability of Scholars leverage their Experience for future career Opportunities and strengthening their resum Ability of Scholars to relate and interact in a seamless community of teaching and research	There is an increase in prestige and reputation for TTU This program will help to improve teaching and research in academia Scholar mentors • Serve in preparation for research conference • Serve as research faculty Mentors • Carry out program development and innovation Informed career choices for Scholars Mentor-scholar exchange and Project/Proposal development
3. Strengthen partnering for enhanced participation of underrepresented minorities 4. Research Roundtables and other program events	3. NIH-Bridges, SACNAS, WT-AWIS, JAMP 4. Faculty seminars and workshops in computational biology/ bioinformatics	3. Stronger academics among scholars 4. Improved underrepresented minority participation in STEM 5. Increased awareness of computational biology/bioinformatics	Fewer scholars on academic probation Increased numbers of minority participation increase diversity of applicant pool Increased numbers of mentors and scholars participate in computational biology/bioinformatics		

MEASURES: STUDENT RESEARCH

Evaluation Questions for OUTCOMES	Possible Indicators/Measures	Possible Data Collection Methods and Information Sources	Rank/Priority (include brief rationale)
1. How has the scholar research experience positively or negatively impacted students either short or long term? How do scholars, their lab mates and their mentors feel about the success of the research experience? Has mentoring increased?	1. a. Continued (or increased) number of scholar applications b. Length of time that scholars remain in research labs that they start with c. Number of student-presented and/or published results d. Retention of scholars by certain mentors e. Scholar-scholar or scholar other undergraduate-graduate students collaborations f. mentors increasingly interact/collaborate	1. Scholar Competition and Scholar/Mentor Annual Report (SAR is both written, includes interviews for feedback a. Monitor numbers of applicants, and current scholars b. Document lab retention or changes and keep track c. Keep records of student contact info, academic progress, travel, awards, presentations and papers, including copies of reprints d. TLTC Focus Groups with scholars about nature of lab and program experiences and interactions with mentor, other scholars and other lab mate collaborations	Scholars apply their undergraduate experience to their careers (science, medicine, law, education, industry) Scholars become leaders in their respective university, science education, research and or corporate communities Program grows and improves its ability to attract future scientists, science education professionals, corporations, and other potential partners who can better mentor or support our scholars and our program
2. After graduation how has the research experience Impacted what the scholars are doing? What is the level of scholar involvement in science post-graduation?	2. a. Scholars that have remained in science education or research in academia b. Scholars that have remained science education or research in industry	2. a. Interviews with alumni scholars and mentors b. Maintain contact with scholar alumni and have them return to the University to evaluate the Undergraduate Research Conference, give talks at special events and Research Roundtables c. Alumni Scholar tracking questionnaire via email and Facebook	Improve and increase institutional support for the TTU/HHMI Program at the Center for the Integration of Science Education and Research, enhancing our ability to successfully leverage other support A primary goal of doing research is to enhance one's ability to read critically, analyze data, develop hypotheses and improve technical proficiency. An additional goal is for participants to become more aware of alternate strategies to answer questions or test hypotheses. We have observed enhanced maturity over time in our scholars in all these components primarily because of the LONG-TERM MULTI-YEAR RESEARCH EXPERINCE WE OFFER. We continue to work to develop Scholars' expository writing skills, a critical component in their development as emerging scientists.
3. How have the funds from HHMI and/or the University match influenced the infrastructure of the programs (and therefore, the scholars in the program)? For example, the Undergraduate Research Center (URC) and their relative ability to travel and present at meetings and publish their results?	3. Correlate Improvements in the URC (computers, study areas, seminar prep/presentation space) to scholar retention in our program	3. Interview scholars about any changes that have taken place and take photographs for documentation; also about ease of requesting and receiving funds for professional travel and or page charges if needed	
4. How has the support impacted the efforts at recruiting and retaining underrepresented groups to our program and in science after graduation?	4. Increase or decreases in underrepresented groups that apply and/or are accepted into the program and what academic or career path taken after graduation	4. Keep records on application numbers, acceptances and retention of all scholars, specifically from underrepresented groups	
5. How have the Research Roundtables and other program events impacted the scholar academic/research efforts and the overall programmatic success?	5. Changes in the scientific culture or appreciation of scholars or in research direction after Research Roundtables	5. Interviews and written scholar testimonials in the SAR: Increases in scholar interactions with participants at Research Roundtables and/or other events	
6. Has Scholar performance improved in the classroom?	6. GPA in science courses improving	6. Review of Scholar grades via the SAR	
7. Are scholars increasingly better with time management?	7. Scholar participation in TTU/HHMI activities and on-schedule response time improved	7. Fewer late submission and more fully engaged participation in activities/improved SURE responses	