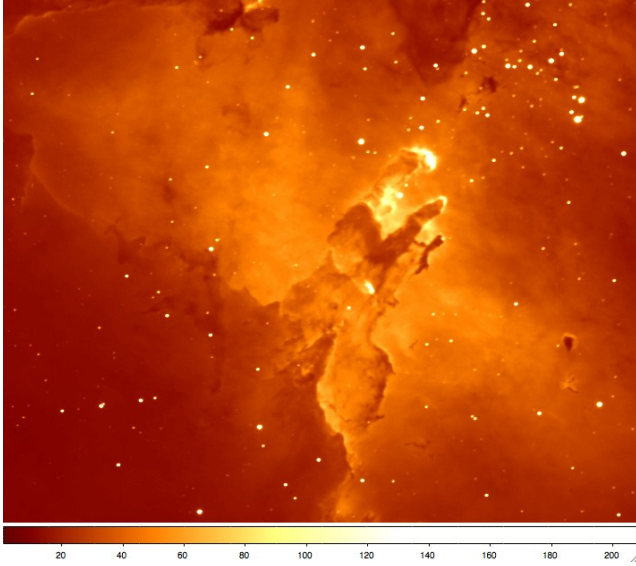


## Advanced Astronomy Camp at the WIYN 0.9-m



***Figure 1: An H-alpha image of the star-forming region M16 (the Eagle Nebula) used as part of an Astronomy Camp team's study of the masses of young stellar objects. Credit: Eric Hooper, Kamala Ganesh, Catherine Miller, Brenna Robertson.***

During four nights in late June, high school students from around the world assembled on Kitt Peak and used the WIYN 0.9-m telescope, among others, for advanced observing projects as part of the 20<sup>th</sup> Advanced Teen Astronomy Camp. In this annual week-long experience, Campers became real astronomers. They operated research-class telescopes and instrumentation, kept nighttime hours, interacted with leading scientists, investigated their own questions, interpreted their observations, presented results, and, most importantly, had fun.

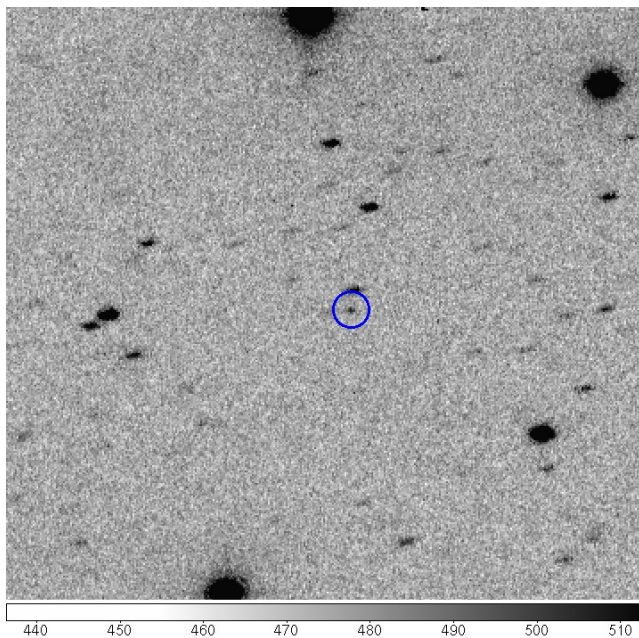
These teenagers traveled from 13 states, three Arizona cities, and Spain. Overall, 21 of the 24 students were from out of state. Special efforts were made to recruit Tohono O'odham students, and we were pleased to have one such student in the Advanced Camp. Twelve adult counselors served as research advisors, mentors, and role models. Many of these staff members were former Campers, and included graduate students, postdocs and faculty members from Mt. Holyoke, University of Hawaii, University of Arizona, University of Texas-El Paso, University of Colorado-Boulder, Space Telescope Science Institute, and the Laser Interferometer Gravitational-wave Observatory. Dr. Eric Hooper of the University of Wisconsin-Madison was the primary Camp leader at the 0.9-m facility.

Astronomy Camp emphasizes a hands-on learning approach, and activities are driven by student involvement and interest. Throughout the week, our students were immersed in realistic research experiences. The process began online before Camp by posing research questions and exchanging ideas. During the Camp, students formed teams and wrote telescope proposals for review by an internal Time Allocation Committee, which generated a four-night telescope schedule. Throughout this experience, astronomy served as a teaching tool to demonstrate science, engineering, math, and technology in action. Each day the students also contributed to the Observatory by undertaking outdoor service projects.

The Campers carried out many different types of observations, some of which are illustrated here. At the WIYN 0.9-m telescope, they obtained multi-band CCD images of the asteroid 2059 (Baboquivari) and measured its VRI-band colors for the first time. Images were also obtained for projects involving pattern speed of spiral galaxies, chemical evolution of nebulae, quasar photometry, and activity in Comet Garradd (C/2008 Q3). The 2.3-m Bok telescope was used for associated visible spectroscopy. Campers will continue

to work on these projects as they pursue both local and national science fair competitions. One student, Mr. Harry Gaebler, recently won the Astronomical League's National Young Astronomer Award for his work on the pattern speeds of spiral galaxies.

We are grateful to Ms. Hillary Mathis (WIYN) and to all the personnel from Kitt Peak, both on the mountain and downtown, who worked very hard to make a positive impact of the lives of a new generation of astronomers and leaders. Dr. Ron Probst graciously exchanged his scheduled 0.9-m observing time so our nights could be contiguous. Student scholarships and general support were provided from adults who have attended Astronomy Camp, NOAO education, as well as NASA through Space Grant funds. The Camps are sponsored by The University of Arizona Alumni Association. More information can be found at [astronomycamp.org](http://astronomycamp.org).



**Figure 2: An R-band CCD image of asteroid 2059 (Baboquivari) obtained at the Advanced Camp with the WIYN 0.9-meter telescope and processed by Dr. Eric Hooper. This object is very faint ( $V=22.2$ ) and required stacking images of a moving object so background stars appear streaked.**