OBSERVING REQUEST
University of Arizona Observatories

Year: 2015 **Term:** Jan–Jul **Proposal type:** education/outreach

ASTR 337: Projects and Observing for our Liberal Arts Minors

P.I.: Don McCarthy (SO; *dmccarthy@as.arizona.edu*; 621-4079)

CoI(s): _____

Abstract of Scientific Justification

ASTR 337 is a new course designed to engage our Liberal Arts minors in hands-on, observational astronomy. Students will be observing primarily from campus, but it is important that they also experience real research observatories. The Kuiper 1.5m telescope provides an ideal and convenient platform for this purpose. Students will not only be able to view by eye but will also conduct projects using the electronic instruments available from Astronomy Camp for CCD imaging and spectroscopy. I request one dark/gray night per month in both March and April to provide such authentic experiences.

Summary of observing runs requested for this project

Run	Telescope	Cage	Instrument	PI	AO	Nights	Moon	Scheduling: Optimal	Scheduling: Acceptable	Sharing: Poss.	Sharing: Adv.
1	61”	f/13.5	CampEquip			2	D	Mar/Apr	Mar/Apr	no	no

Scheduling constraints and unusable dates *(up to 4 lines)*: see specific dates listed Scientific Justification.

no text past this line

A ⋆ appended to the proposal type indicates a continuation proposal; a ⋆ appended to the name of a proposer indicates the proposer is a (graduate) student; a proposer whose name is underlined is certified on the proposed telescope/instrument combination; if a ∗ appears within the PI or AO box in the observations summary table, the instrument is a PI instrument and/or Adaptive Optics are requested – signatures are required on the next page.

Target list (attach list if longer than 26 objects)

#	Object	RA	Dec	mag / color / type / redshift / comment / etc.
1	*(Identify at least 1 object)*			

Approval for Instrument Use from PI: _____

*(have instrument PI signature appear on, or attach PI e-mail to, **all** copies)*

Graduate students *(provide the following information for **each** student named as PI or CoI on the cover page. Have the advisor's signature(s) appear on **all** submitted copies)*

Student's Name	Advisor's Name	Advisor's Signature	2nd-yr	Thesis

Scientific Justification

Todays college students have seldom built or measured anything of interest to them. However, the dynamics of building and measuring are essential parts of science and can help make science come alive. GenEd astronomy students are unlikely to get such opportunities because our courses lack a laboratory component. This deficiency seems especially unfortunate given Tucsons reputation as the Astronomy Capital of the World due to its favorable sky conditions. A new course (ASTR 337) will help fill these gaps and provides an especially important experience for our Liberal Art minors who would otherwise never have a realistic observing experience despite investing many hours in our classrooms and courses.

On a near-daily basis each student will be engaged in hands-on construction, measurement, error analysis, interpretation, and presentation as a means of appreciating and understanding the sky, both day and night. We begin building simple tools and end using authentic telescope systems. Approximately once per week, each student will build a new measuring tool and use that tool on a continuing basis to record natural phenomena, both astronomical and atmospheric, in Tucsons generally clear skies. In their daily journaling students will document their measurements, observations, drawings, and personal reactions.

The daily language of the class emphasizes quantitative thinking, resourcefulness, creativity, the scientific method, and communication skills. Homework is required for each class period to keep students engaged in regular (and correct) observations and to improve their skills steadily.

Sessions on Monday and Wednesday allow time for outdoor nighttime observing on campus, including sunsets. Fridays session allows daytime observing of the Sun and atmosphere. Twitter communication will enable real-time observations of transient phenomena, rapid sharing of observations, and team building. Communication via Twitter and cell phone may also facilitate coordinated observations across the US relating to parallax, etc.

After two months of such preparation, students will be ready to experience an authentic research facility. I propose to use the Kuiper 1.5m telescope to provide realistic, project-oriented experiences under dark skies with electronic instrumentation provided by the Astronomy Camp program. Potential projects include measurements of light curves (variable stars, asteroids, exoplanets), CCD imaging in interesting spectral bands, and CCD spectroscopy (classification, redshifts, etc. for galactic and extragalactic sources).

I request one dark night in both March and April (both on Fridays or Saturdays) to mitigate against weather and to be able to split the group into manageable sections. At this time the enrollment is unknown.

Experimental Design & Technical Description *Describe your overall observational program. How will these observations contribute toward the accomplishment of the goals outlined in the science justification? If you've requested long-term status, justify why this is necessary for successful completion of the science.* (***up to one page***)

Summary of Time Requested and Awarded *The TAC needs to understand the scope of this project — (1) tell us how many UAO nights you've already had for this project, how many you request this time, and (a good guess of) how many you need to complete the project; (2) if a substantial amount of observing for this project comes from non-UAO telescopes, tell us about that observing, and how the UAO part fits in; (3) if you are collaborating with people who have telescopes, especially if you are part of a large collaboration, tell us who is leading the project, and how UAO time and your participation fit in. (**up to one page**)*

Previous Use of Steward Facilities *List **all** allocations of telescope time for the present project and allocations for other projects on facilities available through UAO during the past 2 years, together with the current status of the data (cite publications where appropriate). Mark those allocations related to the present proposal (i.e, precede text with* `\related` *command). (**up to one page**)*