

Proposal Evaluation Criteria for McDonald Telescope Time

The McDonald TAC provides the following list of criteria used to judge proposals in the hope that the criteria will be helpful, both to researchers submitting McDonald proposals, and to McDonald TAC members in providing written feedback to the proposer.

Each member of the McDonald TAC evaluates proposals for a given telescope. Individually, the TAC members grade proposals on their own experience and expertise in accordance with the given grading criteria, but collectively, they determine how well your proposal meets the criteria below.

(1) What is the scientific context of the proposed observations? How do they fit in with and extend ongoing research? How will the proposed observations impact research in the sub-field, in the field, or even in astronomy as a whole? What is their value as a research project? Have the objectives been declared to be important or endorsed by a national science-oriented body (e.g., National Academy of Science, National Science Foundation, and National Aeronautics and Space Administration)? Discussion of any one of these items would suffice. Although illuminating something we don't understand is scientifically justifiable, it is not enough to make a proposal competitive. This bullet is often referred to as providing the "Big Picture".

(2) What hypothesis will be tested? What competing scenarios will the observations likely distinguish between? Which of several interpretations is being tested which, if rejected, will simplify the picture significantly? If a complex model is being tested, what are the criteria of the test? What are the implications for the uniqueness of the model if the fit to the proposed data is good? The relevant case should be discussed.

(3) A concise statement of the observing plan (instrumentation, data products, and methods of reduction and analysis, weather/seeing constraints) and specific scientific goals help the TAC understand what the end result of the proposed observations. Remember, the TAC is reading 25-35 proposals over a few days, so clear, short sentences make for a better understanding of what the proposer is setting out to accomplish. The TAC is charged to evaluate only what is presented in the proposal, do not assume they are an expert in your field.

(4) Are the observations needed to verify a newly-announced and unexpected result which could affect the course of research in a field or change the current paradigm?

(5) Are the observations time-critical and infrequent? Do they have to be carried out this trimester? Do they represent a target of opportunity (hard to predict but important scientifically)?

(6) Are the proposed observations particularly suited to McDonald Observatory skies, telescopes or instrumentation? Uniquely suited? (This match to McDonald usually yields a higher score)

(7) Is the proposed telescope and instrumentation the best suited at McDonald Observatory for the proposed science? This is most important for 2.7m proposals where the time pressure is greater and some projects on brighter objects could be done on the 2.1m and its instrumentation. Is the proposed observing procedure adequate and method/targets for any needed absolute calibration OK?

(8) Estimate of exposure time on primary objects and justification for S/N (signal to noise ratio) needed and number of nights requested. A quantitative estimate of these is desirable, but exposure times for a given S/N as determined empirically from actual previous observations using the instrument are acceptable. A realistic estimation of the number of nights is required based on exposure and setup times as well as weather/seeing factors. This item is less important if the telescope time is driven by factors other than exposure; e.g., time-critical events.

(9) Is there evidence that observations collected at McDonald Observatory during the past 2 years are being reduced and analyzed in a timely fashion? If not, why not? If published, or submitted for publication, a simple reference will suffice here. This item is usually graded as either satisfactory or unsatisfactory, keeping in mind that not all observing runs are successful. A good publication record is necessary to demonstrate that the end product of a scientific investigation is actually being achieved.

(10) Are the proposed observations parts of a dissertation? Is progress being demonstrated both on the data reduction front as well as the overall understanding of the science?

Explanations for underlined items in the TAC evaluation criteria

1. **S/N:** means signal to noise ratio. Signal refers to the light from the target object, such as a star, planet, nebula, quasar, etc. The noise comes from many different sources, such as the instrument itself, defects in the light detector, light pollution, and Earth's atmosphere.

2. **2.7m** or **2.1m:** shorthand for the 2.7-meter (107-inch) Harlan J. Smith telescope or the 2.1-meter (82-inch) Struve telescope at McDonald Observatory. These numbers refer to the diameter of the telescope's primary mirror. The larger the primary mirror, the more light the telescope can gather – and the farther or fainter the astronomer can see.

3. **Reduced and analyzed**, or **reduction and analysis:** Astronomers record light using digital detectors, similar to a digital camera, that produce digital images. Astronomers “reduce an image” using software tools to extract specific information such as the brightness of a star, or position of an object in the image.

4. **Dissertation:** refers to the body of written work that a doctoral degree candidate produces to document their science research and results. The work represents new additions to the scientific body of knowledge.