From the Director

Jeremy Mould

Adaptive Optics Development Program

Two years ago, NOAO hosted a remarkable workshop that produced a consensus about the best development path for adaptive optics (AO), now called the Adaptive Optics Roadmap. This road map (at *www.noao.edu/dir/ao*) outlines the steps that must be taken over the next 10 years for the community to benefit fully from widespread application of AO systems to every area of ground-based optical/infrared astronomy.

The strongest motivation for AO is science with the Giant Segmented Mirror Telescope (GSMT). This year, in the hopefully continuing climate of growth at the National Science Foundation (NSF), the foundation has found it possible to fund some progress along the road. Those with an intellectual, practical, or institutional interest in AO should see for the announcement of a new Adaptive Optics Development Program (AODP) at *www.noao.edu/system*.

Long-Range Plan

Like most institutions close to the federal budget process, NOAO publishes a long-range plan at about this time each year. NOAO's Long-Range Plan FY2003–2007 can be found at *www.noao.edu/news_rep.html*. I have described the past year as NOAO's year of partnerships, referring to the collaborations that will make it possible for NOAO to do its share in implementing *Astronomy & Astrophysics in the New Millennium*. Partnerships are also the enabling mechanism for the national observatory's overall plan.

When NOAO enters a partnership, it is not like joining a club. It is rather the opposite: we bring with us the research community's articulated ambitions and requirements. We enter partnerships like the Large Synoptic Survey Telescope (LSST) Corporation (see following article) or CELT/GSMT with a clear and limited purpose.

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In LSST and GSMT, NOAO is making a commitment to help pursue the design and development of these Decadal Survey concepts with the input of independent community science working groups. This commitment continues to the stage when an NSF decision can be made whether to fund a proposed and fully costed design. It remains to be seen whether LSST and CELT will evolve into partnerships that operate facilities like WIYN and SOAR. However, NOAO's move to join these partnerships at this stage lays the foundation for the kind of public-private partnerships envisaged in 2000 by the National Research Council's survey committee, which identified full community participation at the design stage as a fundamental prerequisite.

Sabbatical Leave at NOAO

Whether you're the chair of the astronomy department in a college in the Keck northeastern astronomy consortium or you've been counting the years teaching Astronomy 101, I encourage you to consider NOAO if you're thinking of taking a sabbatical. You will be very welcome at either Tucson or La Serena should you prefer to spend your year or six months leave with NOAO. Regardless of your specialty—cosmology, spectroscopy, surveys, star formation, asteroids, or theoretical astrophysics—you will find like-minded colleagues at both of our locations, eager to enjoy the pleasure of your company and your insights about astronomy. The hospitality of our staff is renowned, and both my office and Malcolm Smith's will be there to provide the support you need to make your sabbatical the energizing experience it should be. We look forward to hearing from you.

Women in Astronomy II: Ten Years After
27–28 June 2003, Caltech—Pasadena, CA

Purpose: To review the current status of women in astronomy, understand their work environment, assess developments since the 1992 Baltimore conference, and recommend future actions that will improve the environment for all astronomers. Don't miss out on this second landmark conference.

On-line Registration Available: Deadline June 16
www.aas.org/%7Ecswa/WIA2003.html

LSST Corporation Begins Work

Adapted from Press Release LSSTC-01

The Large Synoptic Survey Telescope (LSST) Corporation Inc. has been formed by Research Corporation, the Association of Universities for Research in Astronomy (AURA) Inc., the University of Arizona (UA), and the University of Washington (UW), for the purpose of designing and constructing this challenging new telescope. The corporation held its first meeting on April 16.

The LSST will use an 8-meter primary mirror and a two-billion-pixel digital camera to scan the complete visible night sky every week to a deep magnitude. Its steady flood of images will be supported by a robust computer data pipeline, designed from the start to make the LSST's multi-terabyte daily output readily accessible by astronomers from all over the world.

The immediate goal of the LSST Corporation is to prepare a detailed design for consideration by funding organizations and foundations, toward telescope first light as early as 2011. No site has yet been selected for the telescope. The LSST Acting Director is Tony Tyson, and the LSST Corporation will soon be placing an advertisement for a Project Manager.

"The LSST is the next big leap in charting the heavens, and an exciting technological challenge," said Research Corporation President John Schaefer, who was elected chair of the LSST Corporation board at its first meeting. "It provides Research Corporation an opportunity to fulfill an important role as a catalyst in enabling leading-edge science to take place."

"The LSST Corporation is a landmark public-private partnership," said Jeremy Mould, director of the National Optical Astronomy Observatory (NOAO), which represents AURA in the new organization. "The formal existence of this corporation is a concrete step in the construction of this powerful telescope, and a symbol of how most large astronomical facilities will be built in the future."

"With the establishment of the LSST Corporation, we can begin to implement this very innovative and powerful telescope concept, originally proposed by Roger Angel," said Peter Strittmatter, director of the UA Steward Observatory. "The LSST presents not only unique opportunities for astronomical science, but major challenges for optics fabrication and alignment. We look forward to playing our part in meeting these challenges."

"The University of Washington is drawing upon its strong heritage in time-domain and survey astronomy to help address the survey's formidable data processing challenges," said Christopher Stubbs, a UW astronomy and physics professor who serves on the LSST board. "In addition, the UW's experience with building wide-field astronomical camera systems will be beneficial in developing needed instrumentation."

For further information on the LSST, see *www.lsst.org.*

David Sprayberry
Director of the NOAO Major Instrumentation Program

After spending eight years as a practicing attorney in the Portland, OR, area, David Sprayberry decided to pursue a different type of intellectual challenge, one that has roots in his childhood fascination with the night sky. He went back to school and earned a PhD in astronomy from the University of Arizona in 1994, and then served as a postdoc at the Kapteyn Institute at the Royal University of Groningen in the Netherlands and as a support astronomer at the Isaac Newton Group of telescopes on the Canary Islands. Most recently, David was Associate Director for Observing Support at the W. M. Keck Observatory in Hawaii, where he managed nighttime observer support activities and ongoing maintenance of facility instruments, as well as Keck's work in receiving and commissioning new instruments.

David started work at NOAO in January 2003 as the manager of the newly organized Major Instrumentation Program. His responsibilities include overseeing the management of the major instrumentation projects underway, both in Tucson and La Serena; developing the strengths within the engineering group to enable its adoption of new projects; positioning the group to develop the innovative technologies needed for future instruments; and promoting the group as a source of instruments and new technologies. The goals of the group are to provide a pipeline for the construction of new instruments for Gemini, to develop technologies that enable future instrumentation, and to become a viable competitor to provider instruments for the Giant Segmented Mirror Telescope (GSMT) and the Large Synoptic Survey Telescope (LSST).

How did your experience at the Keck Observatory prepare you for this job at NOAO?
My job at Keck gave me great experience in coordinating inter-disciplinary teams of engineers and scientists. Luckily, I like "herding cats," as the expression goes. It's a unique challenge, given how bright, independent, and highly motivated these people tend to be. I also worked closely with teams building new instruments for Keck and preparing to integrate them onto the telescope—I was on the "receiving end" of four instruments while I was there, and I saw a wide spectrum of preparedness and respect for the needs of the observatory. It really gives you a sharp sense of what is right and wrong with how the instruments were designed and built in the first place.

What are the biggest near-term challenges facing the instrumentation program?
The biggest challenge is management, from two perspectives. The first is the sad loss of Roy Autry and the gap that he leaves in project management. Neil Gaughan is fully taken up with finishing the Gemini Near-Infrared Spectrograph (GNIRS) and preparing for the early June Preliminary Design Review of NEWFIRM, but we expect to have other projects that need project management. We are planning to hire a replacement for Roy in the next 12 months. In fact, as we look for a replacement for Barry Starr in the detector area, we hope to find someone with electronics systems project management experience as well as electrical engineering skills. The second management hole is in day-to-day management of the ETS group. As Larry Daggert shifts the bulk of his efforts to the LSST, we need to make sure that the ongoing management of the Engineering and Technical Services (ETS) group remains strong, which means additional help. For the longer term, there is also a challenge to attract the top talent we need to handle the big projects that are coming, and the related "Sales & Marketing" of them, while matching this hiring to budget.

What can we expect from GNIRS in the next year?
We still anticipate shipping GNIRS south to Cerro Pachón in early June, leading toward first light in September after T-ReCS checkout is complete. GNIRS should be available for science observations in 2004B. It's been a bumpy road, but I expect that it will be the best-performing instrument "right out of the box" that Gemini has ever had. The NOAO Flex Rig facility testing helped us catch and fix a few minor issues, and the optical performance looks outstanding. We think it will prove to be worth the wait!

Where does NOAO go from here with instrumentation for Gemini?
The Aspen, CO, meeting in late June will drive the science priorities for the next several instruments that Gemini is likely to fund. The US community, led by Taft Armandroff, has prepared an excellent series of science cases to support

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Q&A continued

new instruments. One instrument that may meet these science needs is a Super-Phoenix concept by Ken Hinkle. It uses the same detector configuration as NEWFIRM and would cover a wider wavelength range than GNIRS does, with a lot higher resolution. This would be a powerful tool for studying the evolution of lower-mass stars and "cold" solar system objects. There is also the exciting Kilo Aperture Optical Spectrograph (KAOS) being coordinated by Arjun Dey. KAOS would give Gemini the ability to take simultaneous spectra of a tremendous number of objects over a very large field of view. These capabilities are needed to support such science goals as mapping the stellar abundance gradient in the Milky Way through stellar spectra, and mapping the acoustic oscillations of the early universe by deep and wide-field galaxy redshift surveys. This would provide some new insights into the equation state of dark energy.

What is your overall approach to coordinating work across NOAO North and South?
Clearly, our future lies in greater collaboration between Tucson and Chile, which started with the Gemini South Adaptive Optics Imager proposal effort. Whatever we submit to Gemini after the Aspen process will have a lot of north/south elements. We are also working closely on a couple of current projects, such as cryogenic lens mountings for NEWFIRM, and the Monsoon detector hardware. We are trying to have more frequent, even daily, interaction, both by video and by travel.

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Where do we stand on the Monsoon controller and why is it important?
The basic idea is a detector controller that is sufficiently scalable to handle a single detector chip or a mosaic over a large range of pixel counts. We need an architecture flexible enough to meet a range of optical and infrared devices, and one that is sufficiently "open-sourced" that people can modify as needed for various projects. The first performance goal is for it to control four 2K × 2K chips for NEWFIRM, which essentially involves compressing a rack of electronics into a single box.

What are the prospects for an adaptive optics system on the SOAR 4-meter telescope?
The concept presented at the design review in April looks very promising. This system's particular niche is in correcting for the turbulence in the so-called ground layer, an area of adaptive optics that nobody has really pursued yet. The science performance goals are not tied to diffraction-limited seeing over a small field of view, but rather to improve the seeing by a factor of two over a wide field of view, and at shorter wavelengths. Then you can take advantage of improved seeing for many wide-field surveys. The basic concept has great importance for the GSMT, because a number of its instruments need this kind of improved seeing. The next steps are to refine the mechanical, electrical, and software designs to a level where we can produce a credible schedule and budget.

What is your vision for the role of the Major Instrumentation Program in the development of the GSMT and the LSST?
The long-term goal of the Major Instrumentation Program is for it to grow into a viable competitor to build instruments for these ambitious facilities. For LSST, we are rebuilding our CCD testing capabilities and planning for the next evolution of Monsoon after NEWFIRM, so it would be capable of controlling orthogonal charge transfer in suitable CCDs. For GSMT, the near-term effort is focused on refining conceptual designs for the instruments most likely to survey the science case competition currently underway, and to identify the critical technology development that those instruments will need. The GSMT instruments will be challenging on a scale that we have not imagined, and it is a very exciting and motivating prospect for the scientists and engineers in this group.