



# SARA OBSERVATORY NEWSLETTER

Issue #4

Autumn 2001

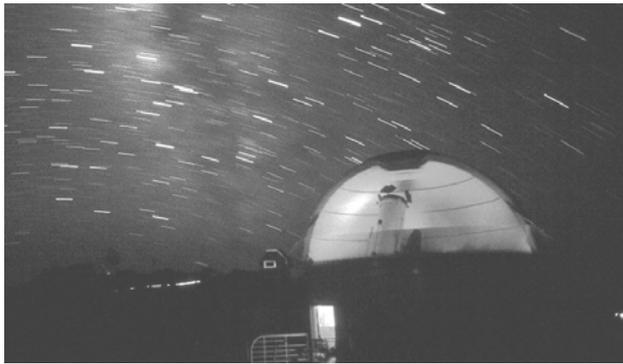
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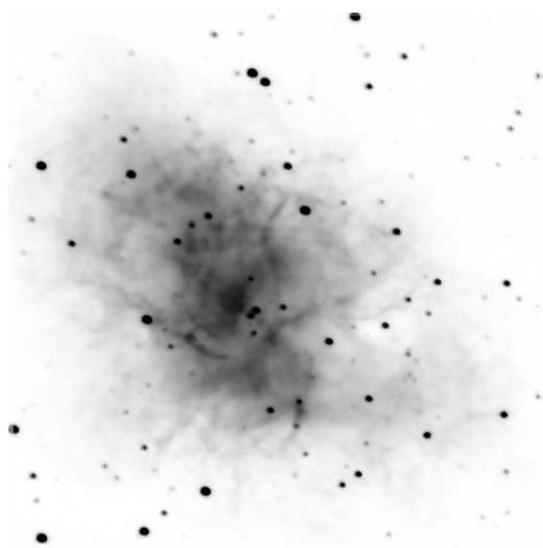
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"X-ray" image of the interior of the SARA dome, obtained by rotating the dome during a time exposure. (Photo by Terry Oswalt)



V image of the Crab Nebula obtained December 2000 with the SARA 0.9-m telescope. (Image by Ken Rumstay)

## From the Editor's Desk

K.S. Rumstay, VSU

Autumnal greetings to one and all! My name is Ken Rumstay and I have served, since SARA's formation in 1989, as Valdosta State University's member on the Board of Directors. Beginning with this issue I am also editor of the biannual SARA Observatory Newsletter. Our former editor, Michael Bradshaw, has recently left his position at Florida International University and has returned to Tucson. Michael has not left SARA, however! He continues his association with us by serving as a remote observing assistant. We wish him well in all his future endeavors.

In this issue you will find the latest news from the Southeastern Association for Research in Astronomy. We begin on page two with coverage of the most recent meeting of the SARA Board of Directors, held September 28<sup>th</sup> on the Florida Tech campus. Observatory Director James Webb then reports on the SARA telescope's current status. The past year has seen a phenomenal increase in usage; SARA astronomers now observe (either on-site or remotely) on nearly every clear night in support of a wide variety of research programs. Next we report on the Summer 2001 Research Experiences for Undergraduates Program. This year's program was highly successful! Eleven highly qualified students came from around the United States to spend the summer at the six SARA campuses. On page seven we hear from Erika Reinfeld, who participated in the 1999 SARA REU program and who is now employed at the Harvard Smithsonian Center for Astrophysics. I hope to make "alumni news" a regular feature of this newsletter. On the final page is another new feature which will appear as space permits: in "Ephemera" we will look at ways in which astronomy and its study have influenced the arts and our common culture.

This is the first issue of the Newsletter to appear since the tragic events of September 11<sup>th</sup>; the world is now a very different place from what it was. How the field of astronomy will be impacted is difficult to gauge. As this is written the January meeting of the American Astronomical Society in Washington D.C. is going forward as planned. Seven of our REU students plan to present their summer research at this meeting, and several SARA faculty will be in attendance. We wish everyone a pleasant and fruitful meeting, free of incident!

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## Notes from the Autumn 2001 Meeting of the SARA Board of Directors

K.S. Rumstay, VSU

The Autumn 2001 meeting of the SARA Board of Directors was held September 28<sup>th</sup> on the campus of the Florida Institute of Technology. After the minutes of the April 7<sup>th</sup> board meeting were approved, Observatory Director Jim Webb reported on the status of the 0.9-m telescope facility at Kitt Peak. His report is summarized on page three of this issue; most notable is the fact that the telescope is now enjoying nearly maximum possible usage under our current constraints for remote observing.

Next on the agenda was telescope allocation for the period October 2001 to April 2002. According to the terms of our consortium agreement, each SARA school receives a quantity of observing time on the 0.9-m Kitt Peak telescope proportional to that school's total financial investment in SARA. In past years the telescope was somewhat under-subscribed, and scheduling it was a relatively simple task. Now that most observing is done remotely the telescope is in high demand by over a dozen astronomers, and much compromise is necessary! Unfortunately, at this point we cannot schedule *all* observing time months in advance. SARA requires that a Remote Observing Assistant be on hand at Kitt Peak during all remote observing sessions. Currently we have three ROA's on the SARA payroll: Adam Block, Elaine Halbedal, and Mike Bradshaw. These individuals are on hand to provide emergency assistance when needed; on several occasions remote observing would have been impossible without their intervention!

After the TAC meeting, members adjourned to lunch at the President's Dining Room. Upon returning to business Chairman Terry Oswalt distributed a budget report, and the

board identified allocation items for the remainder of FY02. With the addition last year of Clemson University as a SARA member the consortium is in sound financial shape, and our annual income from member dues now exceeds our projected expenses by a sound margin.

REU Program Director Matt Wood then summarized the Summer 2001 Research Experiences for Undergraduates program. This year's program was noted as being particularly successful from a research standpoint, with every participating student obtaining publishable results. Some concerns were voiced, most notably the desirability of all REU programs adopting uniform application deadline and acceptance notification dates. In previous years SARA's application deadline has been later than average, and we lost many promising candidates to competing programs. This year our application deadline was much earlier. However, several students accepted into the 2001 SARA program remarked that they had had to make their decision before hearing from other programs to which they had applied.

Gary Henson described the status of the International Small Telescope Consortium (ISTeC) website. This site had been out of commission for some weeks following an unfortunate system malfunction, but is now once again online. The meeting was then joined by a group of FIT media students who are taking charge of an exciting project: a new SARA video which will document the consortium's history.

The Board then discussed the merits of joining a proposed consortium to take over operation of a number of smaller telescopes at the Cerro Tololo Inter-American Observatory. No action was taken; however, we will give further consideration to this proposal in future.

The next meeting of the SARA Board of Directors is scheduled for March 29, 2002 at Clemson University.



SARA members Gary Henson, Scott Shaw, and Brad Meyer discuss the observing schedule for the coming six months, while Terry Oswalt gets another cup of coffee. (Photo by Ken Rumstay)



SARA musicians Matt Wood and Jim Webb entertain the board members after the meeting. (Photo by Ken Rumstay)

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# Observatory Director's Report

## James Webb, FIU

### I. Introduction

The past six months have seen the SARA telescope in fully subscribed, remotely-operated observational mode. Although problems have occasionally cropped up, for the most part the telescope has been operating well enough for all users to carry out their observational programs. That is not to say that things cannot be improved! Quite to the contrary, we are now looking to improve the performance, reliability and accuracy of the telescope, its cameras, and the resulting data it produces. In view of the airline problems occasioned by the events of September 11<sup>th</sup>, and the fare increases that will undoubtedly follow, access to a remotely operable telescope is an extremely valuable commodity.

Once again a rewarding and well-received SARA REU program was the highlight of the summer. The students and faculty who visited on-site were able to really enjoy the experience in addition to getting a lot of good work done. The fact that most students had experienced remote operation of the telescope made it much easier for them when they arrived on-site. The new CD burner is so much easier to use than the old data storage methods that it has transformed the observing experience from a 24-hour race against the clock into a night job.

The addition of Mike Bradshaw as a Remote Observing Assistant has allowed us to utilize even more of the dark time and he has worked out well. I have established (with input from Adam and Elaine ) some guidelines to assist both the ROA and the user in determining where responsibilities begin and end. Comments from all users indicate that Adam, Elaine and Mike are wonderful assets to our observing program. I know that whenever I observe remotely, I have had nothing but great experiences with all three.

Sadly, we had to cancel our order for an autoguider CCD, due to delays in delivery. Also, our fond hopes of accomplishing many projects during the August shutdown was thwarted by a number of factors, primarily the late delivery of parts such as the new CCD for the autoguider and the absolute encoders. These problems are discussed below.

I would like to thank Matt Wood for his tireless work with the SARA web site. As we all know the FIT computer, which hosted our web pages, died and many (most) of the web improvements Matt had made died with it. Matt now has resuscitated the web site, perhaps not back to its original splendor, but good enough. Thanks Matt, your work is appreciated!

### II. Telescope Usage

Telescope usage is pretty much at the maximum possible value since we have added another Mike as another ROA. All SARA schools are using the telescope regularly, both

remotely and on-site. The approximate breakdown is as follows:

FIT – 35%    FIU – 14%    ETSU – 7%  
VSU – 14%    CU – 12%    UGA – 9%.

Due to the loss of several weeks of observers reports (which note problem nights and equipment failures) we are not able to accurately reconstruct the usage completely, but time lost to equipment failures was relatively minimal.

### III. Telescope Problems

Tracking problems and occasional pointing problems persist. Installation of the absolute encoders and the ACE pointing model was scheduled for the August shutdown. Unfortunately, late delivery of the encoders and last minute programming problems in the pointing model prevented these improvements from being done in August, and in early September as well. Since installation of the absolute encoders will require bracket fabrication and installation, the telescope would be out of commission for a few days. Peter Mack feels that, since we are now observing every available night, he should install the absolute encoders and pointing model on the WYIN 0.9-m telescope first and then do our telescope. Since the WYIN 0.9-m is not currently in service he can take his time, get the bugs out, and then install ours with a minimum of downtime. This does sound desirable and reasonable, although it does delay the installation further for us. The same philosophy has been proposed for the pointing model. Until the pointing model and absolute encoders are installed mapping the worm gear is not feasible, and we will not see any improvements in tracking until this work is done. Fortunately, these are not serious deficiencies, so patience is in order.

No progress has been made with regard to the optical improvement project. Fabrication of the new secondary mirror and image control equipment has been put on the back burner, as we all have been very busy using the telescope make observations. Very few other problems exist right now with the telescope and the ACE operating system. We are still anxiously awaiting incorporation of the weather station (including cloud sensor and lightning sensor) into the ACE control system, and for ACE to communicate with the Maxim DL camera control program.

### IV. Instrumentation

The AP7 CCD camera is still not operating very well. It is the workhorse instrument at the present time. The older, large-format AP4 is not currently being used because the cable needs to be replaced. The filter wheels are all installed and working as designed.

Our current computer facilities are adequate for our needs and operate at a reasonably fast speed. The new UPS systems are up and functioning.

We still need to connect and calibrate the cloud sensor and lightening detector. They are installed, but are still not

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hooked into the weather station nor are they interfaced into the ACE software.

After much waiting, we are still waiting for an autoguider. The problem lay with the company contracted to provide the CCD camera; due to manufacturing problems with the chips and controlling electronics, delivery was delayed indefinitely. Many communications regarding the status of the camera were sent; few were answered. After significant discussion, the board decided to cancel the order. Even the order cancellation was not acknowledged at first! We submitted an order to a different manufacturer, based upon a recommendation by Peter Mack. We are now awaiting delivery of that camera, which is also overdue, but only by about one week. We anticipate receiving the camera the week after the board meeting; our next task in this area will be to carve out some time from the observing schedule for installation of the autoguider.

The robotic system has yet to be installed for a "test drive". Problems with the pointing model cropped up in August and that resulted in very little work being done on SARA during the August shutdown. We hope to have this installed and communicating with the CCD camera in the very near future.

## V. ISTeC and REU

The International Small Telescope Consortium (ISTeC) website, supervised by Gary Henson (ETSU), is being revamped to bring it up to date. The SARA REU program was once again outstanding. Matt Wood's effort in running the REU program was excellent, and the results showed in the success of every single research project. Each research paper given by the students was of AAS quality, bar none. Several publishable results were obtained and by and large the students said this was the best experience of their scientific lives. Keep up the good work Matt!

## VI. Future

For the future I want to stress a few things which we must address. Several projects await immediate attention; including:

1. Installation of the absolute encoders
2. Installation of the autoguider
3. Installation of the ACE robotic module with pointing model
4. Improved polar alignment
5. Calibration and integration of cloud sensor and lightning detector into the weather station and station access through the ACE program
6. Cable replacement for the old Apogee CCD camera.

Given the large backlog of required tasks, we might want to consider employing a local technical person to handle maintenance that does not require Peter Mack's expertise. I don't know how board members or Ace will feel about this suggestion. It is clear that Peter and ACE really want to see these projects done and are putting in enormous numbers of

hours, but are spread very thin by several projects. I would like the board to consider this option.

Looking farther ahead, someone needs to seriously look into fabrication of a new secondary mirror and any other steps we might take to improve image quality. We need to decide whether we want to pay for this out of SARA funds or to try and write a grant proposal for it. Any volunteers?

## VII. Summary

In summary, it has definitely been a productive year in terms of research, but few of the improvements we were hoping to accomplish were actually done. One of our priorities should be to complete the critical projects which affect the telescope's tracking and pointing as soon as possible. In certain parts of the sky we can get good images on ten-minute exposures, whereas in other portions of the sky (more than two hours west of the meridian) we can barely get usable data. This situation is simply unacceptable and needs to be corrected, either by a software (pointing/tracking/worm-mapping) fix or with an autoguider. If we can get these improvements made before the end of the year we should be in great shape to continue being a working, productive professional observatory!

## News Notes from SARA Schools

K.S. Rumstay, VSU

Dennis W. Marks, Head of the Department of Physics, Astronomy, and Geosciences at Valdosta State University, retired from that position on June 30, 2001. While not himself an observational astronomer, Dennis was highly supportive of SARA and was instrumental to VSU's joining SARA during its formation. During the summer of 2000 he mentored REU student Larry Arbuckle. We all wish Dennis well in all his future endeavors and will keep readers posted of his doings!



Emulating Atlas, Dennis Marks supports the world in an obviously staged photograph in VSU's planetarium. As Head of VSU's Department of Physics, Astronomy, and Geosciences, Dennis shouldered a burden nearly as onerous! (Photo by Frank Flaherty)

## The Summer 2001 SARA REU Program

K.S. Rumstay, VSU

Since the summer of 1995 SARA has operated a summer Research Experiences for Undergraduates (REU) program in astronomy. There are about a dozen such astronomy programs in the nation; sponsored by the National Science Foundation, they provide opportunities for qualified undergraduate students to participate in research programs under the tutelage of faculty mentors at a variety of host institutions. SARA's program is unusual in that SARA is not a single institution, but rather a consortium of six universities. Participants in our program are allowed a great deal of flexibility. Students are allowed to schedule their appointments (of eight to ten weeks duration) to begin as early as mid-May and to end as late as mid-August. The NSF grant provides each student with a stipend, housing during the summer, and travel to and from the SARA REU site, to Kitt Peak for an observing run, to two workshops at the beginning and end of the summer.

One distinguishing feature of SARA's REU program is its extensive recruitment effort. We send more than 3000 flyers to literally every four-year college and university in the United States. These efforts are rewarded each summer with 100 to 200 applications from nearly every state! During its first seven

years of operation (1995-2001) a total of sixty-eight students have participated in our program.

This year's students and faculty mentors are listed in the table below, along with project titles. Students selected for our program typically come from a wide variety of educational institutions (ranging from community colleges to Ivy League universities), and with a wide variety of backgrounds. This year was no exception! We tend to have a fairly even gender mix; this is not by design (each mentor selects his or her own student), but it is a welcome outcome! Unfortunately we receive very few applications from minorities; this appears to be a problem common to most REU programs in the sciences. As the project titles suggests, not all students engage in observational research at optical wavelengths; all do however spend time at the SARA observing facility at Kitt Peak.

During each summer all students and faculty mentors participating in the SARA program are brought together at two workshops. The first provides an opportunity for everyone to become acquainted and to learn about the wide variety of research projects which they will be participating in. The second meeting at the end of the program provides a forum in which students present their results, just as they would at a professional meeting such as those held semiannually by the American Astronomical Society.

### 2001 SARA-REU Students

Name	Home Institution	REU Institution	REU Advisor	REU Project
Alan W. Akin	Auburn University	FIT	Hamid Rassoul Joe Dwyer	The UV Monitor and Sky Camera
John J. Bochanski, Jr.	Villanova University	FIT	Terry D. Oswalt	The Search for Periodicity in Cool Blue White Dwarfs
Matthew J. Casey	Iowa State University	FIT	Matthew A. Wood	The Search for Periodicity in the Helium Dwarf Nova KL Draconis
Claudia J. Cyganowski	Harvard University	CU	Dieter Hartmann	The Nebulosity of FY Aquilae?
Douglas B. Gobeille	Connecticut College	FIT	Matthew A. Wood	Monte Carlo Simulations of White Dwarf Populations in Open and Globular Clusters
Heather D. Guenther	Biola University	ETSU	Gary D. Henson	Monitoring Select Mira-type Stars for Short-Term Variability
Brian R. Kent	West Virginia University	FIU	James R. Webb	Optical Observations of the Gamma-Ray Blazar PKS 1622-297
Misty A. La Vigne	Western Maryland College	UGA	J.Scott Shaw	A Photometric Analysis of Eclipsing Binary Stars, With a Surprise!
Robyn D. Levine	University of Pittsburgh	VSU	Kenneth S. Rumstay	A Photometric Study of Selected Active Galactic Nuclei
Stacey R. Long	University of Oklahoma	CU	Brad Meyer Mark Leising	Short-Lived Radioactivities and the Birth of the Sun
Marcus Y. Woo	Cornell University	UGA	Andreas Scheitzer	Modeling Phase-Resolved Spectra and Atmospheres of Mira Variables
Jeffrey Tharpe*	University of North Carolina at Asheville	PARI	Michael Castelaz**	Remote Local Weather Observations Using Daytime Astronomy

\* REU student sponsored by the Pisgah Astronomical Research Institute

\*\* Director of Astronomical Studies and Education at PARI

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## Photographs from the Summer 2001 REU Program



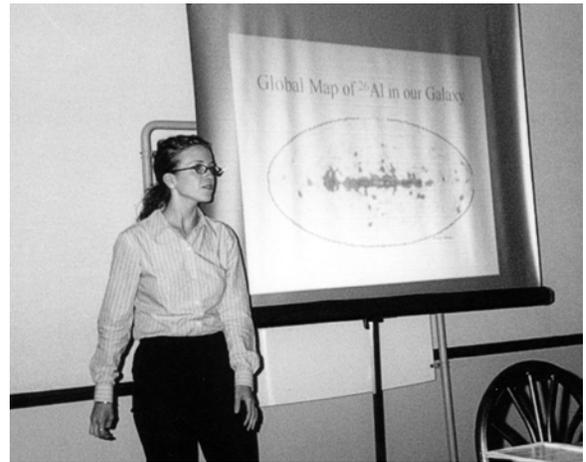
Matt Wood and Caroline Simpson lead the Women in Astronomy session at the second group meeting. (Photo by Ken Rumstay)



Robyn Levine observes active galaxies with the SARA 0.9-meter telescope at Kitt Peak. (Photo by Ken Rumstay)



Brian Kent, accompanied by faculty mentor Jim Webb, presents his research on a Gamma-Ray Blazar. (Photo by Ken Rumstay)



Stacey Long describes the synthesis of aluminum-26 nuclei within the Milky Way. (Photo by Ken Rumstay)



Dr. Gordon Patterson conducts a workshop on Ethical Issues in the Sciences at the second group meeting. (Photo by Ken Rumstay)



The 2001 SARA REU students pose *en masse* at the end of the second workshop at Florida Tech. (Photo by Ken Rumstay)

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The first group workshop was held June 1<sup>st</sup> and 2<sup>nd</sup> on the campus of the University of Georgia at Athens, with Scott Shaw handling all the local arrangements. Much of the meeting was given over to the faculty mentors, who presented brief summaries of their fields of research. Of course, there was plenty of time for socializing! After the UGA meeting each student spent most of the ensuing eight weeks at his or her summer institution, busily engaged in astronomical research. An REU internship is essentially a full-time job, although interns are encouraged to make time to socialize and to explore local attractions.

One feature of SARA's REU program which has proven particularly attractive to applicants is that all participants have an opportunity to travel to the Kitt Peak National Observatory in Arizona to observe with the SARA 0.9-m telescope. In a typical summer between half and two-thirds of our students engage in projects based upon optical data obtained during an observing run (typically lasting four to six days) at the SARA facility. In each case the student is accompanied by a faculty mentor; they are often joined by a student who is pursuing a theoretical investigation or who is analyzing non-optical data obtained elsewhere. Although these students do not obtain data relevant to their own project, they participate fully in the observing run and invariably enjoy experiencing the trials and tribulations of observational astronomy. Many students who come from an urban background get their first look at a truly dark sky during their summer with us; that alone makes the Kitt Peak experience an invaluable component of our program!

The second group meeting, held August 3<sup>rd</sup> and 4<sup>th</sup>, was hosted by REU Program Director Matt Wood at Florida Tech. Each year, every REU student is required to present his or her research project at the second meeting, and they must do so in two formats! Each prepares a poster paper and delivers a fifteen-minute oral presentation. The presentations were all quite professionally done, worthy of an American Astronomical Society meeting! Special sessions at the meeting included a workshop on Ethical Issues in Science, led by Dr. Gordon Patterson of the FIT Department of Humanities, and (with the assistance of FIU's Dr. Caroline Simpson) a discussion of Women's Issues in Astronomy. An ethics session has been a component of our REU program since its inception in 1995; The women's issues discussion was instituted in 1999.

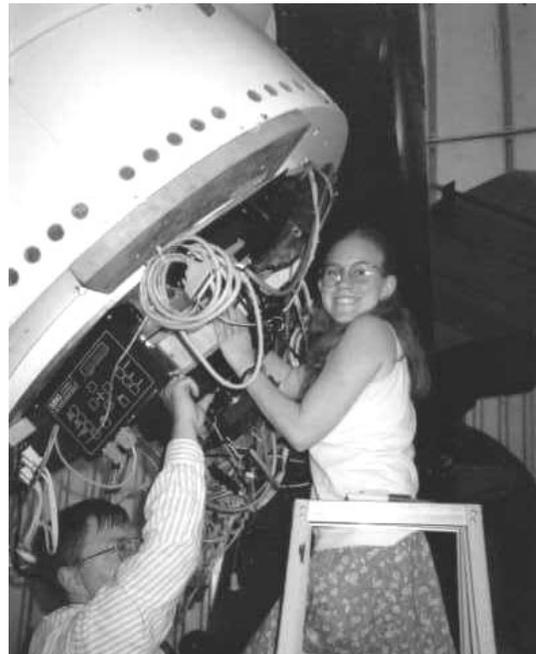
Although our students have all returned to their home institutions, they remain in constant e-mail communication with each other and with their faculty mentors. Students remain on the SARA-REU e-mail list for as long as they desire; we often hear from "alumni" who participated years earlier and who now seek advice as they apply to graduate schools or seek employment. Seven of our students (John Bochanski, Doug Gobeille, Heather Guenther, Brian Kent, Misty LaVigne, Robyn Levine, and Marcus Woo) will be presenting their research at the 199<sup>th</sup> meeting of the American Astronomical Society, to be held January 6-10, 2002 in Washington D.C. We wish them well, and bring you news of the meeting in our next issue!

## News from our Alumni K.S. Rumstay and E.L. Reinfeld

SARA strives to stay in touch with all students who have participated in our REU program. I recently heard from Erika L. Reinfeld, whom I mentored during the summer of 1999. Erika came to us from Wellesley College, where she majored in Astronomy and Theatre (a rare combination!). She writes:

"You ask what I've been up to since SARA. I'll skip the problem sets and exams, since I'm sure no one wants to read about those. I spent the summer of 2000 working on preservation of Apollo-era space suits at the National Air and Space Museum\* and then returned to Wellesley College for my senior year. As you know, I double majored in astronomy and theatre studies, and my senior thesis was a terrific opportunity to combine the two. I wrote, directed and produced a children's musical called "The Case of the Missing Matter." The show, in which a ten-year-old girl detective was called upon to solve the Dark Matter problem, featured such characters as Doctors Dorkus, Geekum and Nerdle, Star White and the Brown Dwarves, Molly and Jaelyn Hyde (a diatomic hydrogen family), a cheerleading proton named Polly ("Give me a p! Give me another p! Bang 'em together! What do you get? Fusion!) and Blacky, the menacing black hole who turned out not to be so scary once we got to know her, as well as songs like "Easy as Pi" and "The Black Hole Blues." As you would suspect, the cheesy astronomy jokes were plentiful, but I think people actually learned something about dark matter in the process.

\*Described in *Science News*, Vol. 158, No. 9, Aug 26, 2000, p.135.



Erika Reinfeld and Ken Rumstay frantically reassemble a filter wheel during a summer observing run in 1999. (Photo by Lisa Downward)

“That pretty much took me through the end of my senior year, at which point I was shamelessly thrown into the so-called Real World to fend for myself with only a liberal arts education and a slight distrust of New England squirrels to show for my efforts. Luckily, I was picked up by the Harvard-Smithsonian Center for Astrophysics, and I’m currently working in the Science Education Department.

“My main project is the “Cosmic Questions” traveling exhibition, scheduled to open this coming fall at the Boston Museum of Science and then travel around the country for three years. It’s a cosmology exhibit about the universe, its mysteries, our place in it, and how we observe it from a multi-wavelength perspective. I’ve been working to provide image and content support to the developers and soon my energies will be redirected towards helping to develop educational materials to supplement the exhibit as it tours the country. I’m having a great time and I really enjoy the world of “informal” education, as the non-classroom sector is called, not to mention the actual use of my undergraduate degree. I used to joke that I should take on a part-time job as a waitress so I could tell people that I’m using both my majors, but between the CFA, volunteer work, teaching self-defense and enjoying the Boston area, I’m keeping pretty busy. However, I still look back on my summer with SARA fondly and as I watched the Leonids over Revere Beach yesterday morning, I couldn’t help but remember the skies over Kitt Peak in the summer of ‘99. And wish that northern winters were a little more conducive to pink flamingos.

“I hope everyone from SARA is doing well and enjoying his or her respective adventures, astronomical or otherwise.”

*Erika L. Reinfeld, SARA ‘99*



## Ephemera K.S. Rumstay, VSU

One nice thing about editing an organizational newsletter is that usually nobody else wants the job. Consequently, one can (within reason) insert just anything one wants into the publication without hearing any complaints! Since there’s a bit of space left over this month, I’d like to share one of my passions with you. A fair number of astronomers (including your editor) collect postage stamps; some specialize in stamps with astronomical themes. The most famous practitioner is perhaps Michael Seeds, who has for years incorporated images of such stamps into his popular textbooks. The set of six stamps illustrated below was issued in 1942 to commemorate the Astrophysical Congress held in Mexico in February of that year, and to inaugurate the new observatory at Tonanzintla.



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Kenneth S. Rumstay, Editor

The SARA web page is [www.saraobservatory.org](http://www.saraobservatory.org)  
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