

# Astronomical Society of New York

Spring Meeting, April 30, 2005

Bloomer Auditorium, St. Lawrence University

PRIZE LECTURES: 30 MINUTES + 5 MINUTES FOR DISCUSSION INVITED TALKS: 40 + 5 CONTRIBUTED TALKS: 10 + 5
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**9:00 Coffee and Pastries**

**9:30 Invited Talk**

Fred Walter (Stony Brook) -- SMARTS: Opening the Temporal Domain in Astrophysics

10:15 Kevin Lyons (Stony Brook) --Determination of Membership of the Subgroups of the Ori OB1 Association

10:30 Angeliki Field-Pollatou (Stony Brook) -- Survey of Young Open Clusters and Associations in the Southern Hemisphere

**10:45 Coffee Break**

11:00 Wayne Roberge and Glenn Ciolek (RPI) -- Formation of Multifluid, Magnetohydrodynamic Shock Waves

11:15 Thomas Balonek (Colgate) -- Quasars and Variable Stars at the Colgate University Foggy Bottom Observatory

**11:30 Special Presentation**

Jeffrey Miller (SLU) and Marc Staves (APO) -- Building an Observatory in the Park: Creating the Adirondack Public Observatory

**12:00 Lunch**

(courtesy ASNY and St. Lawrence)

Hannon Room (322), SLU Student Center

**1:00 Invited Talk**

Michael Inglis (SCCC) -- Robots, Meteors & Cosmic Rays: A Day in the Life of an Astronomer at SCCC

1:45 Mary Crone Odekon (Skidmore) -- A Very Liquid Heaven: Presenting Astronomy at a Contemporary Art Museum

2:00 Yoshitaka Morimoto and David Meisel (Geneseo) -- The Temperature of the Moon at 1420 MHz

**2:15 Break**

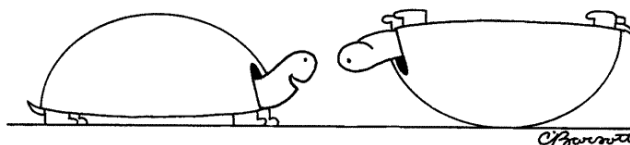
**2:30 Undergraduate Prize Lecture**

Kevin Flaherty (U of R) - A Spitzer Survey of NGC 2024 and the Surrounding Region

3:05 Emily Bauer and David Meisel, (Geneseo) -- Discovery of a Micrometeor Stream

3:20 David Meisel, (Geneseo) -- A Statistical Investigation of Micrometeor Properties During Atmospheric Entry Over Arecibo

**4:00 End of Meeting ... Happy Trails!**



*"Wow, I've never met an astronomer before."*

# Abstracts

9:30 INVITED TALK

## **SMARTS: Opening the Temporal Domain in Astrophysics** **Fred Walter (Stony Brook)**

SMARTS is a consortium of universities and institutions which operates the four small telescopes at the Cerro Tololo Interamerican Observatory. SMARTS offers a variety of service observing and traditional user observing opportunities. The service observing affords the luxury of long monitoring campaigns, as well as the opportunity to respond quickly to targets of opportunity. I shall illustrate this with movies of the spectral evolution of some recent novae.

I will outline how SMARTS operates, and how participation in SMARTS has enhanced not only our professional research, but also the educational opportunities available for undergrads and grad students at Stony Brook. Finally, I shall try to sell the ASNY member institutions on the advantages of joining SMARTS in order to facilitate undergraduate (and faculty) research.

10:15 CONTRIBUTED TALKS

## **The Formation of Multifluid, Magnetohydrodynamic Shock Waves** **Wayne G. Roberge and Glenn E. Ciolek (RPI)**

Shock waves in molecular clouds generally have a multifluid structure, wherein the charged and neutral components of the plasma act as separate, interacting fluids. Theoretical models of multifluid shocks are required to interpret the wealth of spectroscopic data now available on shock waves observed in many interstellar environments, especially the molecular outflows from protostars. The vast majority of prior models describe steady shock waves, where all of the fluid variables are constant in time. Here we present an exact, time dependent solution for the formation of a multifluid shock. We show that the flow evolves through separate dynamical phases governed by physical effects with distinct time scales. Implications for spectroscopic observations of interstellar shock waves are discussed.

## **Determination of Membership of the Subgroups of the Ori OB1 Association** **Kevin Lyons (Stony Brook)**

The Orion OB1 association is subdivided into three subassociations: Ori OB1a,b, and c, in addition to the Orion Nebula Cluster (Ori OB1d). These subassociations are at different distances from us, and are of different ages. However, the photometric data for high-mass stars in the association does not clearly demonstrate that there are distinct differences between the subgroups. We believe that the reason for this discrepancy may be the reddening of the observed light by interstellar gas and dust. To determine if this is the case, we will use spectroscopic data to re-determine the spectral types of these massive stars. This yields the intrinsic colors of these stars. Comparing this with the observed colors from the literature, we will be able to determine the reddening for individual stars in our survey. We hope then to be able to assign each star to one of the subassociations and determine the spatial extents and memberships of each.

This project has been supported by NSF grant AST-0307454 to SUNY Stony Brook

## 11:00 CONTRIBUTED TALKS

**Survey of Young Open Clusters and Associations in the Southern Hemisphere**  
**Angeliki Field-Pollatou (Stony Brook)**

The goal of this optical survey is to create a uniformly deep data set for open clusters and associations in the Southern Hemisphere using the SMARTS telescopes. We are aiming at clusters that are not well studied in order to uniformly determine basic information like age and distance and calculate the initial mass function and mass segregation for the different clusters. We have picked a sample of approximately 70 clusters that are closer than 2kpc, younger than 100 Myrs and have an apparent diameter smaller than 15arcmin. We have acquired data for 15 clusters and some preliminary results will be discussed.

**Quasars and Variable Stars at the Colgate University Foggy Bottom Observatory**  
**Thomas Balonek (Colgate)**

## 11:30 SPECIAL PRESENTATION

**Building an Observatory in the Park: Creating the Adirondack Public Observatory**  
**Jeff Miller (SLU), Mark Staves (APO)**

Four years ago, a group of amateur astronomers decided to create an observatory in their hometown of Tupper Lake, nestled in the heart of the Adirondack Park. The idea was to create a place where astronomers could increase the public's awareness of astronomy by sharing their knowledge of the sky, and where students from local schools and universities could engage in serious research. This led to the creation of the Adirondack Public Observatory (APO), a non-profit organization comprised of amateur and professional astronomers.

In this talk we will discuss the reasons the APO was founded, the current stage of operations, the discussions we've had with local and state government officials, and what we hope to ultimately achieve once the observatory is built.

## 1:00 INVITED TALK

**Robots, Meteors & Cosmic Rays: A Day in the Life of an Astronomer at Suffolk County CC**  
**Michael Inglis (Suffolk County Community College)**

SCCC is the largest community college in NY state, with well over 1000 students taking an Earth & Space Science course. Of these, around 600 take one of the several Astronomy courses on offer. As well as the traditional methods and equipment used in teaching the students all about the wonders of the Universe, the College has embarked on an exciting program of expansion which includes the use of Robotic Telescopes, digital planetariums, and public outreach programs. In addition we have joined forces with Brookhaven National Laboratories to develop, build and use novel equipment to detect both High-Energy Cosmic Rays and Meteors. This highly illustrated talk will seek to briefly outline just a few of the projects mentioned above.

## 1:45 CONTRIBUTED TALKS

**A Very Liquid Heaven: Presenting Astronomy at a Contemporary Art Museum**  
**Mary Crone Odekon (Skidmore)**

I will describe an exhibit at the Tang Teaching Museum and Art Gallery at Skidmore College. Co-curated by an artist, an astrophysicist, and a professional curator, the exhibit includes historical

documents and atlases as well as work by a variety of contemporary artists and scientists who address the human perception of stars. The Tang Museum has an active program of outreach and publication, and is used extensively by faculty and students.

### **The Temperature of the Moon at 1420 MHz**

**Yoshitaka Morimoto and David Meisel (SUNY-Geneseo)**

The 3 meter Samuel J. Goldstein, Jr. radio telescope at SUNY-Geneseo has been used to obtain the phase dependence of the integrated lunar temperature at 1420 MHz. From this phase curve, the thermal average properties of the lunar material down to a depth of 10 wavelengths (2.1 meters). Not only is the subsurface temperature low (<100 K), but it lags the surface input by more than 180 degrees.

2:30 UNDERGRADUATE PRIZE LECTURE

### **A Spitzer Survey of NGC 2024 and the Surrounding Region**

**Kevin Flaherty, Judy Pipher, Robert Gutermuth (University of Rochester), S. Thomas Megeath (CFA)**

Images of the young star-forming region NGC 2024 as well as NGC 2023 and the Horsehead nebula were taken with the IRAC camera on the Spitzer space telescope. These images were analyzed to determine the fraction and distribution of young class I, class II sources. Active star formation is evident in the central area of NGC 2024 as well as in NGC 2023. Also the interstellar reddening was estimated to NGC 2024 and found to differ from previous measurements at longer wavelengths.

3:05 CONTRIBUTED TALKS

### **Discovery of a Micrometeor Stream**

**Emily E. Bauer and David Meisel (SUNY-Geneseo)**

Since 1997, over 100,000 micrometeors have been detected using the UHF radar at the National Astronomy and Ionospheric Observatory at Arecibo in Puerto Rico. Recently a micrometer has been found in data from February 2001 with the help of an AI driven analysis program out of Penn State University. Out of about 19,000 detections during this time period, 102 of the objects were seen to have velocities around 20.4 km/s and occurred with the same daily periods. Sizes are directly calculated by half of the objects, which were sent to decelerate in the atmosphere, the other half being calculated by a statistical method using the decelerating data. Sizes of the particles range from sub-micron to 150 microns. Stream orbits resemble those of Aten asteroid orbits, but no clear parent of the particles has been determined as of yet. Orbit periods are close to 0.5 years, showing that Earth and Moon perturbations are among significant factors in determining the dispersion.

### **A Statistical Investigation of Micrometeor Properties During Atmospheric Entry Over Arecibo**

**David Meisel (SUNY-Geneseo)**

Using a sample of over 12000 micrometeor entries where deceleration has been detected in two periods Feb 2001 and April 2004, I have discovered two interesting height correlations that enable the sizes of particles where deceleration is not observed to be determined. Use of these correlations essentially doubles the sample size of Arecibo detected particles for which orbit perturbations by the solar wind and radiation pressure may be calculated.