

# Daily Planet

SUMMER/FALL 2007

The Department of  
 Atmospheric,  
 Oceanic and Space  
 Sciences Newsletter

*"Speaking personally, I'm very pleased that I came to the University of Michigan, and much of that is due to the students we have."*

— Bill Kuhn  
 May 1988



On Tuesday, May 1, 2007, AOSS faculty, students, staff and alumni took time out to honor Professor Bill Kuhn who on June 1 began his "official" retirement after 40 years in the department. Friends and family came to help celebrate his career in the style requested by Bill: low-keyed and simple – not at all like the lasting influence he has had upon many, many students, faculty and staff alike.

As a fitting tribute, many AOSS alumni traveled to Ann Arbor for the afternoon symposium and the evening dinner/roast. Others unable to attend, lent their thoughts about Bill to the online "Memory Book" (<http://esse.engin.umich.edu/kuhnsymposium>), sharing many memories from the past 40 years. Symposium speakers included former students, colleagues and Bill's son.

- John Olivero, '70  
 Professor & Chair, Physical Sciences Department, Embry-Riddle University  
*The Young Bill Kuhn and I: Some Lessons Learned*
- Michael Chen, '75  
 Professor, Meteorology, Iowa State University  
*Tropical Meteorology Research Stimulated by a Radiation Professor*
- Thomas Griffin, '80  
 Hubble Space Telescope Observatory Manager, NASA Goddard Space Flight Center  
*The AOSS Connection to the Hubble Space Telescope*
- Kevin Czajkowski, '95  
 Associate Professor, Geology & Lake Erie Center, The University of Toledo  
*Professor Causes Earth-Shattering Paradigm Shift*
- Roland Drayson  
 Professor Emeritus, AOSS, University of Michigan  
*Bill Kuhn: Then and Now*
- Jeffrey Kuhn  
 Astronomer, Institute for Astronomy, University of Hawaii  
*Bill Kuhn—The Secret Life of a Closet Astronomer*

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University of Michigan  
1521C SRB  
2455 Hayward Street  
Ann Arbor, MI 48109-2143

(734) 763-7305  
(734) 615-4645 fax  
aossnews@umich.edu

Daily Planet is on the web at:  
<http://aoss.engin.umich.edu/DailyPlanet>

**Chair**

Tamas I. Gombosi

**Associate Chair  
for Academic Affairs**

Perry J. Samson

**Newsletter Editor**

Mary Nehls-Frumkin

**Assistant Editor**

Deborah Eddy

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# AOSS Accolades

## KUDOS FOR AOSS

From Professor Guy Meadows:

“I just returned from the 40th Anniversary Celebration of the Earth and Atmospheric Science Department at Purdue. I am proud to report that AOSS was very well represented and is highly respected nationally. The Keynote Address was delivered by Tim Killeen, Director of NCAR, President of AGU and former AOSS faculty member, and at least three former AOSS grad students are presently at EAS and doing very well. A senior faculty member reported that they are the best he has ever seen in the 40-year history of the (Purdue) Department.

Congratulations to all, keep up the outstanding work.”

## Staff

AOSS Department Manager **Denise Moore** has been selected as a member of the University’s “VOICES of the Staff” Core Team. VOICES is a volunteer-based initiative to give University of Michigan staff members a formal mechanism to share ideas and define the campus community issues that matter most to staff. Moore is a member of the Diversity team, one of six teams, the others being Career Development, Faculty-Staff Communication, Parking-Transportation, Rewards-Recognition, and Benefits-Health-Well Being. The Core Team works directly with the Offices of the President and Provost in an advisory capacity.

## Faculty

AOSS Professor **Lennard Fisk** was recently awarded the 2007 Basic Science Award of the International Academy of Astronautics. The award ceremony will be this fall in Hyderabad, India.

Prior to his retirement in June, AOSS Professor **Bill Kuhn** received the 2007 Outstanding Professor Award presented by the U-M Student Chapter of the American Society for Engineering Education (ASEE). Professor Kuhn was also the keynote speaker at the awards ceremony.

The July 2, 2007 issue of *Newsweek* (July 2-9, 2007) called on **Joyce Penner**, Aksel Wiin-Nielsen Collegiate Professor of Atmospheric, Oceanic and Space Sciences, to comment on climate change in the article “Which of These Is Not Causing Global Warming Today?”

*Formation of C7F15COOH (PFOA) and Other Perfluorocarboxylic Acids during the Atmospheric Oxidation of 8:2 Fluorotelomer Alcohol*, an article co-authored by AOSS Professor **Joyce Penner** and Research Professor **Sandy Sillman**, has been listed as one of the ten most cited papers in the journal *Environmental Science and Technology*. The article was published in January 2006, with a plot prepared from the paper appearing on the journal cover.

# John Eder Wins Staff Service Award

John Eder wears many hats in AOSS. He is the chair of the AOSS Safety Committee and department safety representative, he is SPRL's Reliability and Quality Assurance Manager, and a SPRL Lead Engineer in Research. He also coordinates the department's annual equipment inventory, handles purchasing for the engineering group, acts as the backup facilities manager and gets that old equipment out of the halls and over to Property Disposition. John wears so many hats with such style, that he has been chosen by the College to receive a CoE Staff Service Award.



CoE Dean Dave Munson, presents John with his 2007 CoE Staff Service Award.

and international missions, has brought national and international recognition to the College of Engineering as a premiere center for space research and instrumentation design.”

While working towards his BSE in civil engineering,

John worked in SPRL as a laboratory



John is flanked by AOSS Department Manager Denise Moore (left) and SPRL Assistant Director Charles Edmonson (right)

According to his engineering supervisor, Charles Edmondson, “As Reliability and Quality Assurance Manager, John has been directly responsible for the integrity of design and manufacturing processes for almost all of SPRL's space flight instruments. This is a position that requires both a broad understanding of the instruments' designs and an unerring focus on the details of their manufacture. The success of these instruments, flown on major US

assistant, purchasing agent and parts coordinator starting in 1971. In July 1976 he “officially” joined SPRL as it's Reliability and Quality Assurance Manager. According to his application for the job, John answered the question, “How long do you plan to work here?”, with “Indefinitely”. Boy are we glad he did!

## **AOSS Team Wins IGARSS '06 Prize Paper Award**

*Detection of RFI by its Amplitude Probability Distribution*, which was presented at the 2006 International Geoscience and Remote Sensing Symposium, was awarded the Symposium Prize Paper Award. The authors were **Chris Ruf**, AOSS professor and SPRL director, **Sid Misra**, AOSS graduate student, **Steve Gross**, SPRL engineer and **Roger DeRoo**, AOSS assistant research scientist. The Geoscience & Remote Sensing Society presents the award annually to the best paper out of approximately 1,200 that are presented at the IGARSS.

The authors' winning paper presented information about “a new type of microwave radiometer detector... that is capable of identifying low level Radio Frequency Interference (RFI) and of reducing or eliminating its effect on the measured brightness temperature.”

The Geoscience and Remote Sensing Society is comprised of members coming from both engineering and scientific disciplinary backgrounds and, since 1981, has annually sponsored the IGARSS, the premier world conference on remote sensing programs and activities. Each year IGARSS draws hundreds of scientists and engineers from around the world to hear papers and discuss instruments, techniques, models and programs of global interest.

# Faculty Promotions



**Ward (Chip) B. Manchester IV** has been promoted to Associate Research Scientist.

Chip joined AOSS in 2001 as a Research Fellow, became an Assistant Research Scientist in 2001, and seems to have liked us enough to stick around for this promotion in Sept. 2007 to Associate Research Scientist.

Chip's research deals with solar magnetism and magnetic flux transport from below the photosphere into the corona and through the heliosphere. Most recently, he has modeled the propagation of CMEs from the corona to the Earth with unprecedented numerical resolution to predict the impact on the Earth's magnetosphere. Another project is the modeling of the global heliosphere, which is lead by M. Opher from NASA's Jet Propulsion Laboratory (JPL).



**Igor Sokolov** has been promoted to Research Scientist.

After being an Engineer (Institute of Physical, Technical and Radio-Engineering Measurements) and Senior Research Scientist (General Physics Institute) in Moscow for 15 years, and an Associate Professor at the Toyama University in Japan, Igor joined the University of Michigan in 2001 as a Visiting Research Scientist before becoming an Associate Research Scientist in 2003.

He suggested, developed and implemented the Field-Line-Advection model for simulating the solar energetic proton acceleration, and has coupled a semi-empirical model for the solar wind with three-dimensional MHD code, which provides a good quantitative description for a background plasma motion in the solar corona and heliosphere. In addition, he is involved in the development of physical models and computational tools for laser pulse interactions with plasmas.



**Gábor Tóth** has also been promoted to Research Scientist.

Gábor received his Ph.D. from Princeton University in 1993 with a dissertation entitled *Instability of Radiative and C-type MHD Shock Waves*. His postdoctoral studies in computational astrophysics were done at the University of Utrecht in the Netherlands and at the Eötvös Loránd University in Budapest, Hungary. He came to the University of Michigan in 2000 as a Visiting Research Scientist, and became an Associate Research Scientist in 2001. Gábor is also an Associate Professor at the Eötvös Loránd University.

His research has included the first numerical simulation of a real space weather event from Sun to Earth and simulations of the magnetosphere of Uranus that are in excellent agreement with the Voyager measurements.

# Rollin M. Gerstacker Professor of Engineering

On July 19, 2007 the U-M Board of Regents approved the appointment of AOSS Chair Tamas Gombosi as the Rollin M. Gerstacker Professor of Engineering. The endowed chair was established by the Rollin M. Gerstacker Foundation to support the teaching and scholarship of a “distinguished member in the College.”

In his letter of recommendation to the Board, CoE Dean Dave Munson stated, “Professor Gombosi’s distinguished career exemplifies the highest standards in all aspects of academic performance. His research and teaching will continue to contribute significantly to the excellent reputation of the College and University.”

Tamas joined AOSS in 1979 and became chair of the department in 2003. As chair, he has directed the revamping



and revitalization of both the undergraduate and graduate academic programs. He is also the director for the Center for Space Environment Modeling, a multi-departmental, interdisciplinary group of faculty, staff, and students.

In 2002, Tamas received the Stephen S. Attwood Award, the highest CoE recognition for faculty. He is a lifetime full member of the International Academy of Astronautics and was elected an American Geophysical Union Fellow.

The Gerstacker Professorship was established by the Rollin M. Gerstacker Foundation, which

was established in 1957 and has made numerous contributions to the College of Engineering. Carl Gerstacker, son of Rollin and Eda Gerstacker and former chair of Dow Chemical Company, was a 1938 Michigan engineering alumnus.

# New Distinguished University Professor

Following closely on the heels of her Collegiate Professorship, Professor Joyce Penner has been named the Aksel Wiin-Nielsen Distinguished University Professor of Atmospheric Science.

Joyce is an internationally recognized expert on the effects of aerosols on the climate system, has served as chair, co-chair or member of numerous national and international committees, and is currently chair of the Atmospheric and Hydrospheric Sciences Section of the AAAS. She served as Report Coordinator and Editor of *Aviation and the Global Atmosphere* (an IPCC Special Report), Coordinating Lead Author for Chapter 5 of the IPCC’s Third Assessment Report and Lead Author of “Understanding and Attributing Climate Change” in the IPCC’s Fourth Assessment Report.



Over the last five years she has played a key role in developing the new AOSS curriculum. Joyce directs a successful research group and received the College Research Excellence Award in 2003, a named Professorship in 2005, and a Service Excellence Award in 2007.

In her spare time, Joyce has served on several AOSS, CoE and University committees including the U-M Institute for Environmental Science and Technology Executive Committee, the Office of the Vice President for Research Advisory Council, the Graham Environmental Sustainability Institute Executive Committee, the College of Engineering Committee on Advanced

Computing (Co-chair, 2000), and the College of Engineering Dean’s Advisory Committee on Female Faculty.

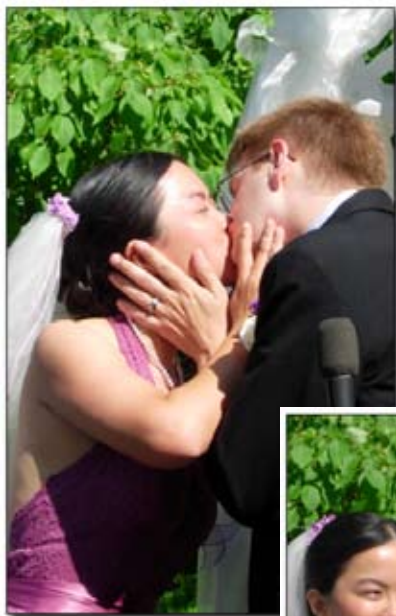
# July 7th Weddings



Many of you remember Konstantin Kabin who received his PhD in 2001 (advisor Mike Combi). Konstantin and Emilie were married on July 7 in Edmonton, Canada, with a Michigan contingent: the best man was Timur Linde; Scott Edgington, Eric Wilson, Mike Barlage, and Eszter and Tamas Gombosi.



On Saturday, July 7 – a beautiful, clear afternoon in Petoskey, MI – current AOSS graduate student Judy Yu and AOSS web developer Bret Squire exchanged vows at a waterfall next to Lake Michigan. They were joined by family, their terrier Beans and friends, including a number from AOSS. Both the day and the couple were dazzling.



## You're Invited ...

The annual AOSS Alumni Reception at the AGU Fall Meeting will again be held in conjunction with the



U-M Geological Sciences Department on Wednesday, December 12, 6:00 – 8:00 PM in the Westin St. Francis Hotel's Tower Salon.

Please forward the invitation to AOSS alumni and friends who may not receive the *Daily Planet*.

Wednesday, December 12

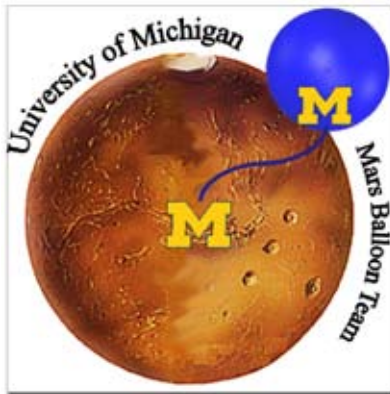
6:00 – 8:00 PM

Westin St. Francis Hotel

Tower Salon

Don't forget to look for the AOSS booth in the Academic Showcase.

*40% of AOSS Tenure & Tenure Track and Research Professors have received high recognition for their research and teaching accomplishments.*



# Mars Balloon Team wins RASC-AL Competition — Again!

The Mars Balloon Team won the fifth annual competition at the Revolutionary Aerospace Systems Concepts Academic Linkage (RASC-AL) conference. The team’s entry was an “Economical Surface Balloon Inflation System for Future Scout Class Mars Missions,” a project they designed in ENG 450 this past semester. The Team showed how a surface inflation technique would be more feasible than previously proposed “conventional” balloon deployment strategies.

**“Nilton’s students are now three-for-three in three consecutive RASC-AL Competitions - a first, I believe, in nearly 25 years of conducting these kinds of programs for NASA,” said Lewis Peach, Universities Space Research Association Vice President for Exploration and Technology. “Congratulations Nilton to you and to your very gifted students! Very impressive, indeed.”**

An important component of the winning project was an education and public outreach exhibit for the Ann Arbor Hands-On Museum. The team designed a “Feel the Solar System” exhibit, which opened at the museum in May.

The Team members are AOSS students Shaneen Braswell, Elizabeth Jones and Shintaro Taniguchi (team leader); ME students Andrew Huang and Ryan Kurkul; AERO student Paul Kuhlman; and EECS student Fei Xu. The Team’s advisor is AOSS Professor Nilton Renno.



The winning Mars Balloon Team with their Ann Arbor Hands-On Museum exhibit



The mission of the Ann Arbor Hands-On Museum is to inspire people to discover the wonders of science, math and technology.

The Ann Arbor Hands-on Museum’s vision is to be the leader in imaginative and interactive learning experiences. They are designing and fabricating an interactive child-proof space science exhibit prototype that coheres with the vision of the upcoming permanent space exploration display at the Ann Arbor Hands-On Museum. The design consists of the magnetized solar system model that will allow users to “feel” the gravitational pull and explore the concept of comparative planetology designed by CoE students.

Please visit the Ann Arbor Hands-On Museum online at: <http://www.aahom.org>. Or, the next time you're in town, visit the Museum at 220 E. Ann Street; 734-995-5439.

## On the Web

Ann Arbor Hands-On Museum online at:  
<http://www.aahom.org>

# Alumni Notes

## Recent AOSS Grad Receives Baldwin Award



Congratulations to recent AOSS graduate Yue Deng who is the 2007 recipient of the annual LS&A Ralph B. Baldwin Prize in Astrophysics and Space Sciences for her thesis “Examining the High Latitude Thermosphere and Ionosphere Using a Global Model.” Dr. Deng, whose advisor was Prof.

Aaron Ridley, will be presenting the Baldwin Lecture on Friday, September 14 in AOSS.

The Baldwin Prize honors the most outstanding thesis in these sciences each year. Dr. Deng’s work showed, “original and significant contributions to her field as measured in her scholarly publications” ... and her selection “speaks clearly to the high regard in which you and your work are held.” Dr. Deng, will receive a cash prize of \$4,000 and a bronze medallion at a special ceremony later this year.

## Michigan Reunions Announcement

The University of Michigan will honor two special alumni groups this fall with campus-wide reunions, each offering graduates a chance to reconnect with friends and rekindle their U-M memories.

Michigan will celebrate the undergraduate classes of 2001 through 2007 across the University with The Recent Grad Reunion to be held September 7-8. Activities include a Casino Night party with Las Vegas-style games on Friday evening and a Saturday tailgate party prior to the football game against Oregon.

The 50th Reunion is slated for Homecoming weekend on October 12-14. University-wide

events will include an Alumni Association Go Blue! Tailgate prior to Saturday afternoon’s Purdue game and a semi-formal dinner later that evening at the Michigan Union, where commemorative Class of ’57 pins will be presented to attendees. Graduates from earlier Michigan classes are also invited back to join in these and related festivities throughout the weekend.

To learn more, visit [www.reunions.umich.edu](http://www.reunions.umich.edu), or call 734-647-6050. The gatherings are presented by the Office of Reunions in conjunction with the Alumni Association and the Office of University Development.

## Where are they now?



A picture from Konstantin’s wedding elicited the following comment: “These three were members of the infamous email group – ‘aoss-beer@umich.edu’ – so good to see they’ve graduated to wine ...”

**AOSS alums from left to right: Eric Wilson, Scott Edgington, Michael (Mike) Barlage**

### Alumni Obituaries

Homer L. Claypole (BSEAA ‘47), February 2, 2007.

Charles N. Hahn (MEng ‘03), October 16, 2005.

### Keep in touch and Keep informed

If you’re an AOSS Alum and have received an award or have an interesting story (particularly recent AOSS graduates), please send them to [AOSS-Friends@umich.edu](mailto:AOSS-Friends@umich.edu).

And, don’t forget to send us your most recent email address so you can stay up to date on all of the happenings in AOSS. Send your contact information to [AOSS-Friends@umich.edu](mailto:AOSS-Friends@umich.edu) and we’ll be sure to send you the next issue of the *Daily Planet*.

# “AOSS Paid Off!”

– Derek Kevra ('07)

*“Meteorologist Derek Kevra started his on-air experience at the University of Michigan in Ann Arbor. He was the chief meteorologist for the U of M cable news channel before taking an internship in Detroit. Derek graduated from the University of Michigan in 2007 with a degree in Atmospheric Oceanic and Space Sciences.”*

So states the web site of NewsWatch12 ABC in Medford, Oregon where AOSS alum Derek Kevra is now one of three meteorologists on staff. After graduating in April, with a BSE in Earth Systems Science with a Meteorology concentration, Derek was off to Oregon, joining KDRV in June. Derek, whose hometown is Livonia, MI, “applied to three schools...when I got accepted [to Michigan] it was kind of a no brainer.” After taking the CoE overview

it was all about presentations, which gave me practice for my career ... I would have to say Prof. Marsik and Prof. Kuhn were the faculty members that helped the most: plus their classes were most relevant (also they were both very nice).”

Between his junior and senior years, Derek had an internship at FOX 2 News in Detroit where he learned the broadcast side of forecasting and realized that on-air meteorology was in his blood and what he wanted to do after graduation. “I got a chance to practice in front of a green screen on several occasions and put together a résumé tape (highlight reel). Around March, I signed with an agent, whose job was to send the



I did phone interviews with most of them and flew out to Medford, Oregon to have a “real” interview. I had two stations in Medford that were interested in me so it seemed to make sense to fly here to check it out. By May 9th I had signed a contract with KDRV in Medford.”

**“Advice: have fun now. The ‘real world’ is fine, but college is a blast. No real responsibilities and you can go out whenever with whomever you want. Oh and give Frank a hard time, he likes that.”**



Oregon seems to suit

course, “I knew that AOSS was a great choice for me. I got to still be in engineering and do math and science, but I also got to study the atmosphere and storms.”

“I liked the hands-on classes at U-M. AOSS 462 was amazing – we applied what we learned in instrumentation. Of course I enjoyed Frank’s [Marsik] forecasting classes, as this was primarily what I would be using on an everyday basis. I also enjoyed Prof. Kuhn’s AOSS 475 because



tape around to news stations (he has more connections than me ...). I got about seven news stations that contacted me after seeing my tape.

“Preparing weather reports is a lot like Frank’s class. I spend about an hour looking at data and then I prepare a ‘power-point presentation’ for the show. All in all it takes me about 2.5 hours to forecast and produce the show. Then I’m on air from 5:30 to 7:30 a.m., go home for lunch and then come back for a few hours where I help produce graphics for the later shows.

“The AOSS degree has helped because it immediately put me at an advantage to other people that are doing the weather but have no meteorology degree. It’s easier to get hired.”

## On the Web

When you’re in Medford you can watch Derek on *NewsWatch 12 This Morning*. Or on the KDRV web site: <http://www.kdrv.com/content/contentID/17413>

# Faculty Articles Featured in *Science*

The May 11 issue of *Science* features a “Perspectives” article entitled, “Titan’s Organic Factory” by AOSS Professor Sushil Atreya in which he discusses evidence that



complex organic molecules in Titan’s atmosphere may be responsible for Saturn’s smog-like haze.

Since its discovery by Christiaan Huygens in 1655, Saturn’s large moon Titan has intrigued scientists, not the least because its surface is blanketed by a thick haze. This haze plays an important role in warming Titan’s nitrogen atmosphere, preventing its condensation and subsequent removal. However, the most important aspect of Titan’s haze may be its composition. It has long been suspected that the haze results from complex organic molecules, perhaps even prebiotic molecules. Now, close flybys of Titan by the Cassini spacecraft reveal that such molecules may indeed be forming.

The same issue of *Science*

also features a report co-authored by Tamas Gombosi, AOSS chair, entitled, “The Orientation of the Local Interstellar Magnetic

Field.”

The orientation of the local interstellar magnetic field introduces asymmetries in the heliosphere that affect the location of heliospheric radio emissions and the streaming direction of ions from the termination shock of the solar wind. Observations of radio emissions and energetic particle streaming with extensive three-dimensional magnetohydrodynamic computer simulations of the magnetic field draping over the heliopause were combined to show that the plane of the local interstellar field is  $60^\circ$  to  $90^\circ$  from the galactic plane. This finding suggests that the field orientation in the Local Interstellar Cloud differs from that of a larger-scale interstellar magnetic field thought to parallel the galactic plane.

# Atreya Research in *Scientific American*

Professor Sushil Atreya authored the article, “The Mystery of Methane on Mars and Titan,” that was featured in the May issue of *Scientific*



*American*. The cover was based on his article.

**From the article:** “Of all the planets in the solar system other than Earth, Mars has arguably the greatest potential for life, either extinct or extant. It resembles Earth in so many ways: its formation process, its early climate history, its

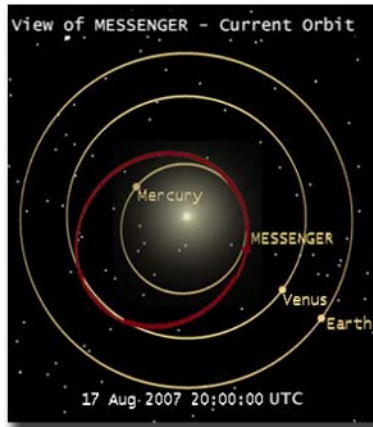
reservoirs of water, its volcanoes and other geologic processes. Microorganisms would fit right in. Another planetary body, Saturn’s largest

moon Titan, also routinely comes up in discussions of extraterrestrial biology. In its primordial past, Titan possessed conditions conducive to the formation of molecular precursors of life, and some scientists believe it may have been alive then and might even be alive now.”

# Mission Update

## MESSENGER Mission to Mercury

The Fast Imaging Plasma Spectrometer (FIPS), built by the Space Physics Research Laboratory and onboard the MESSENGER spacecraft, flew within approximately 210 miles of the surface of Venus on Tuesday, June 5. MESSENGER began making scientific measurements of Venus, as well as testing out its instruments for its rendezvous with Mercury. Congratulations to **Thomas Zurbuchen, Jim Raines** and the entire FIPS team as they get nearer to Mercury. MESSENGER should start a yearlong study of its target planet in March 2011. Find out more about the mission at: <http://messenger.jhuapl.edu>



This image shows MESSENGER's location in its current orbit (in red-brown). The image also shows the orbits and 17 Aug. '07 positions of Mercury, Venus and Earth. Positions of stars with magnitude 9 or brighter are shown from this perspective that is above the Sun and north of Earth's orbit.

Dear All,

At a recent Faculty Meeting, it was mentioned that the Thomas M. Donahue Memorial Scholarship Fund was \$350 away from becoming self-sustaining. I'm please to announce that through the generosity of Nilton Renno, the Fund has reached the magic number of \$20,000. Nilton, thank you from the department and our students who will benefit from the fund.

The Donahue Fund is used to cover the costs of one AOSS graduate student a year attending the AGU Fall Meeting. While the current fund is now self-sustaining, it does not cover all of the meeting costs - which is our next goal. I urge everyone to continue to support the fund and AOSS students with a donation and help the department reach the next goal of \$30,000.

Thank you,  
Tamas

# New Grants

**Stephen Bougher**, *Extension of the Mars WRF Model Upwards into the Thermosphere (0-250 km)*, \$27,600, JPL/NASA

**Lennard Fisk, George Gloeckler**, *Acceleration at the Termination Shock and in the Heliosheath: A Heliophysics Guest Investigation*, \$251,833, NASA

**Kenneth Hansen**, *Understanding the Diffuse X-ray Background: The Extragalactic to Solar System Environment*, \$56,496, NASA

**Kenneth Hansen, Ward (Chip) Manchester IV, Igor Sokolov**, *Time Variability of the Magnetosphere and Solar wind Conditions at Saturn*, \$192,443, NASA

**Xianglei Huang**, *The Large-Scale Dehydration Process Near the Tropical Tropopause: Confront Model with MLS Observations*, \$30,000, JPL/NASA

**Janet Kozyra, Michael Liemohn**, *University of Michigan Contributions to Mars Express Data Analysis*, \$31,000, SWRI

**Nilton Renno**, *Multidisciplinary System Engineering: The Development of Parametric Models and Laboratory Testbeds for Space Exploration*, \$25,000, JPL/NASA

**Nilton Renno**, *2007 RASC-AL Forum Student Travel Support*, \$10,000, USRA

**Aaron Ridley**, *Experimental and Modeling Study of Mesoscale Ion-Neutral Coupling in the Auroral Thermosphere*, \$137,524, NSF

**Aaron Ridley, Darren De Zeeuw, Janet Kozyra, Michael Liemohn, Igor Sokolov, Gábor Tóth**, *Collaborative Research: The Community Whole Magnetosphere Model (CWMM)*, \$1,000,000, DOE-Air Force

**Richard Rood**, *Project Scientist for Modeling, Assimilation, and Prediction (MAP) Program*, \$383,926, NASA

**Perry Samson**, *Quantitative Transport Bias Analysis (QTBA) Hybrid Receptor Model Development: Trajectory Database for 2006 and 2007*, \$5,048, EPA

**Gábor Tóth, Darren De Zeeuw**, *A General Toolkit for Handling Input Parameters for Scientific Software*, \$30,000, JPL/NASA

# Requiem for Matilda

by Debbie Eddy

It's dangerous out there. Matilda knew this. That's probably why she first came to our courtyard to lay her eggs, and why she has graced us by returning for the past 5 years and allowing us to assist her in the raising of her ducklings.



I still remember the first day I glanced down into the courtyard as I was walking past the windows, and did a double-take. Then went rushing around the building telling everyone there was a duck in the courtyard – with babies! It wasn't long before a group of concerned AOSSers gathered to decide what needed to be done. Though the courtyard was protected from all but winged predators, there was no water there for the little ones. Someone had contacted a wildlife rescue service and was told the courtyard was too small for the ducklings to learn how to fly, so we were advised to capture them and take them out to the wild.

Were the windows packed with people laughing hysterically as a bunch of us chased ducklings around the courtyard, diving into the bushes after those little yellow and brown balls of fluff? Or was that just our own laughter in our ears? Either way, we actually managed to capture 10 of the 11 ducklings. But when

that last one continued to elude us, it was decided he couldn't be left behind.

So, a new plan was formed. The 10 were released, a punch bowl was filled with water and settled in the walkway with stones pulled up around it ramp-style. Then we all crowded the windows and watched as the little ones took their first swim.

What a sight! Eleven ducklings packed into a punch bowl swimming round and round, one or another occasionally toppling or being pushed out, only, like any kid, to hop right back in.

The next day the punch bowl was replaced with a pool, which in 2005 was replaced with a bigger pool, kept clean by a dedicated group of people who also saw that the ducks were fed and, when they got big enough to have a decent chance out in the wilds of Ann Arbor, moved to the big pond at the Music School.

Matilda must have appreciated our efforts, since she has returned faithfully every year. Many of us eagerly awaited her appearance in the courtyard as the only true sign that Spring had arrived, and we rejoiced that we had again been found worthy of her trust. She usually showed up in March, announcing her presence vociferously in the early years when the smaller pond was not yet set in its place,

filled with water, and ready for her first dip. Then she would disappear again as she settled into her nesting duties. And her dutiful watchers would be back on pins and needles hoping all was going well, that she was really somewhere back in the bushes and hadn't changed her mind about us and left.

Eventually, finally, at long last she would make her grand entrance. This year it was on May 12th when she strolled into the open followed by 17! ducklings, the proudest momma you'd ever hope to see.

Then came the storm. Just 3 days after that first promenade, as the storm clouds gathered and the wind whipped, Matilda, for some unfathomable reason, flew away from her little ones.

For the next 24 hours we watched the sky and searched the courtyard every time we went past the windows. The ducklings huddled together near the pond in the frigid wind. It was getting too cold for them to be without their mother's warmth. Melissa and Bryan rigged up a cozy box



*What a magical happening to discover a mama duck and her babies in the courtyard the first time! Duck Rescue was formed immediately. The smiles from watching the ducklings' antics more than made up for the dirty work of caring for them. Matilda was Duck Motherhood Extraordinaire - so smart of her to find her own protected nursery, meals provided!! She is sadly missed.*

— Bett Weston



with a warm rock, but the ducklings didn't seem interested in using it. When the temperature was predicted to go into the low 40's the next night, it was decided something more had to be done. They likely would not survive a night of such temperatures.

Once again a wildlife rescue authority was consulted. She agreed with our assessment and promised the little ones a warm refuge if we could get them to her. So, as in the beginning, the duckling roundup was on. Only this time, with five years experience under our belts, the roundup went much more smoothly. All 17 ducklings were quickly and safely captured and settled into a large box, then into a larger box with food and water.

Later that evening, Melissa very kindly took them to the "wildlife lady" where they were settled in a safe environment under warm, comforting lights.

Several times over the next few weeks Matilda's drake (a male duck, this one presumably her mate) was seen in and around the pond. In years past he never spent so much time here. Was he also waiting forlornly for her return?

Is this the end of an era? Or will Matilda's drake find another female and invite her to this safe haven with its free food and dedicated pond cleaners. Or will one of Matilda's many offspring return with a mate to take up residence in the family estate? I guess we'll just have to wait until next spring and see.

Family Portrait 2005

**Memories of Matilda are far ranging for me. Here at work, when I'd be traveling over in the NW Wing area of the building, I'd always look out the second floor window to see Matilda and her brood. They always brought a precious sense of peace & calm amidst the flurry of the hustle and bustle of work. Then there were the times Debbie would either drop by or give me a jingle and say, "can we clean the pond together?" How I enjoyed those times. It was fun to see Matilda watch us as we got closer to finishing our task. No sooner did we get the hose rolled up then she and babies would be back in the pond enjoying the cool clean water once again; babies nibbling at the Japanese red maple tree. In addition, for four years I'd bring my grandchildren over a few weeks after the babies were born to see them and to teach them how to be calm so as not to scare Mommie or her babies. I will forever see Melissa, Max, and then Ed, when he was old enough, sitting on the bench of the picnic table quietly inching their way closer to Mommie and babies who were swimming in the pond. I have precious pictures so none of us will forget the joy they brought to our lives. I'd also bring my elderly friend Aunt Hattie who always beamed when she came to visit. Seeing Matilda and her babies would bring back a flood of memories for her when she lived on the farm and had baby animals.**

**Matilda, you will always hold a very special place in all our hearts.**

**— Marti Moon**

**Each spring I took my children Kayleigh (6) and William (3) to see Matilda's ducklings, which the children greatly enjoyed. These annual visits to the ducklings will be greatly missed.**

**— Chip Manchester**



Pond 1, 2002



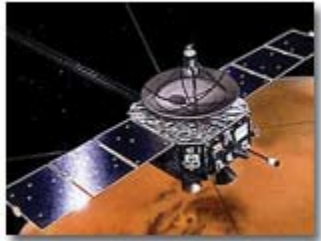
Putting in Pond 2, 2005



# Did you know...

Continued from the '07 Spring *Daily Planet*

In the past few issues, we have been reviewing SPRL's rich history of space instrument fabrication. Since the 1940s, starting with the Langmuir Probes that were ejected from sounding rockets to measure electron temperatures and densities in the ionosphere every decade has seen SPRL instruments gathering data to increase our knowledge of "outer space." The series concludes in this issue with instruments 33 through 39. However, the work of SPRL engineers will continue for what we hope are many decades to come.

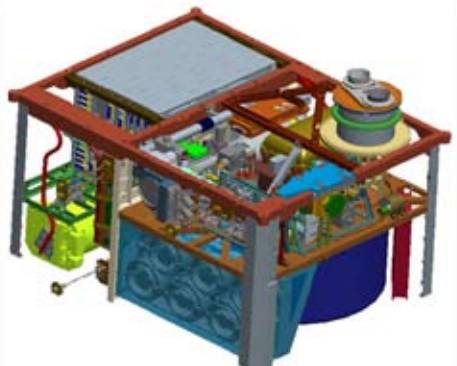


YEAR	DESCRIPTION	REFERENCES
1998	Japanese Space Agency, Planet-B mission; Neutral Mass Spectrometer electronics (33)	<a href="http://solarsystem.nasa.gov/missions/profile.cfm?Sort=Alpha&amp;Alias=Planet-B&amp;Letter=P&amp;Display=ReadMore">http://solarsystem.nasa.gov/missions/profile.cfm?Sort=Alpha&amp;Alias=Planet-B&amp;Letter=P&amp;Display=ReadMore</a>
1999	NASA TIMED (Thermosphere Ionosphere Energetics and Dynamics); TIDI (TIMED Doppler Interferometer) instrument (34)	<a href="http://tidi.engin.umich.edu/">http://tidi.engin.umich.edu/</a>
2000	ESA Rosetta mission; ROSINA instrument (Rosetta Orbiter Spectrometer for Ion and Neutral Analysis) electronics (35)	<a href="http://www.esa.int/SPECIALS/Rosetta/SEM5K0474OD_0.html">http://www.esa.int/SPECIALS/Rosetta/SEM5K0474OD_0.html</a>
2000	NASA Comet Nucleus Tour mission; Neutral Gas and Ion Mass Spectrometer electronics. Spacecraft lost and presumably destroyed (36)	<a href="http://www.gsfc.nasa.gov/news-release/releases/2002/02-93.htm">http://www.gsfc.nasa.gov/news-release/releases/2002/02-93.htm</a> <a href="http://discovery.nasa.gov/contour.html">http://discovery.nasa.gov/contour.html</a>
2003	NASA MESSENGER mission (Mercury Surface, Space ENvironment, GEochemistry, and Ranging); Fast Imaging Plasma Spectrometer (FIPS) instrument (37)	<a href="http://messenger.jhuapl.edu/">http://messenger.jhuapl.edu/</a>
2005	NASA Phoenix mission; TEGA (Thermal and Evolved Gas Analyzer) electronics (38)	<a href="http://phoenix.lpl.arizona.edu/science_tega.php">http://phoenix.lpl.arizona.edu/science_tega.php</a>
2007	Mars Science Laboratory, Sample Analysis at Mars electronics (39)	<a href="http://ael.gsfc.nasa.gov/marsSAM.shtml">http://ael.gsfc.nasa.gov/marsSAM.shtml</a>



## On the Web

More information about SPRL, its projects and engineers is available on the web at:  
<http://www.sprl.umich.edu/>



The Sample Analysis at Mars instrument suite will weigh about 83 pounds (38 kilograms) and make up about half the science payload of the Mars Science Laboratory mission. It is a suite of three instruments that will search for carbon-based compounds associated with life.  
Image credit: NASA/JPL-Caltech

# Phoenix Mars Probe Landing: Questions of Thrust and Dust

By Jim Erickson, U-M News Service

Gusting winds and the pulsating exhaust plumes from the Phoenix spacecraft's landing engines could complicate NASA's efforts to sample frozen soil from the surface of Mars, says U-M atmospheric scientist Nilton Renno.

Set to launch Aug. 3, the \$414 million Phoenix Mars Lander will use descent engines to touch down on the northern plains, where vast stores of ice have been detected just below the surface. A robotic arm will scoop frozen soil and dump it into science instruments that will analyze its chemical content to see if it has the potential to sustain microbial life.

With funding from NASA and the spacecraft's manufacturer, Lockheed Martin, Renno and his students are conducting a series of experiments to determine how much dust the 12 descent engines will kick up and whether Martian winds could interfere with efforts to deliver soil to the onboard mini-lab.

Renno, an associate professor in the Department of Atmospheric, Oceanic and Space Sciences, is a member of the Phoenix science team.

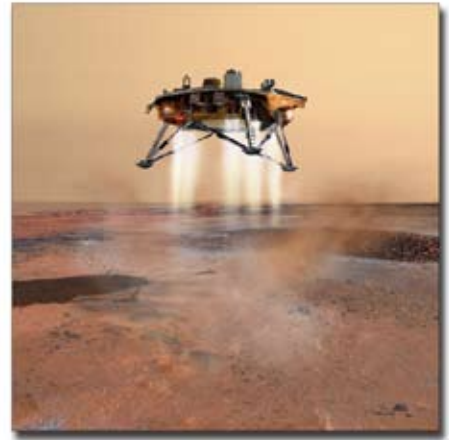
In a laboratory at the U-M Space Research Building, his team built a Phoenix thruster test chamber that looks a bit like a Plexiglas shower stall. But instead of a shower head, the enclosure is fitted with a high-pressure gas nozzle pointing down at a floor covered with 5 inches of reddish sawdust. The pungent wood dust simulates Mars soil, and the

nozzle represents one of the 12 Phoenix landing thrusters.

Instead of liquid rocket fuel, the researchers use nitrogen gas at pressures up to 400 pounds per square inch. They fire short bursts into the soil to mimic the pulsating Phoenix landing engines, filling the lab with dust and a loud, staccato blast like machine-gun fire.

This month the apparatus will be dismantled and taken to NASA's Ames Research Center at Moffett Field, Calif., for additional tests inside a large vacuum chamber that more closely simulates Mars conditions. In the California tests, crushed walnut shells will be used to mimic the behavior of soil on Mars, where the surface gravity is 38 percent of Earth's gravity.

Renno and doctoral candidate Manish Mehta say there are several concerns about the Phoenix thrusters. They say the supersonic exhaust jets could: buffet the spindly, three-legged probe during the critical final seconds before landing; scour the landing site and strip it of loose soil; and possibly contaminate the Martian soil with hydrazine, the liquid fuel used in the thrusters.



“These experiments are mainly run to provide insight to the Phoenix team, so they know what to expect and can somewhat prepare for it,” says Mehta, who will use the results in his doctoral dissertation. Aerospace engineering senior Neal Rusche and other students from Renno's Multidisciplinary Engineering Design course also are on the team.

Another set of Phoenix experiments underway in Renno's lab examines the 8-foot robotic arm's ability to deliver soil samples from its scoop into onboard science instruments. Mission engineers had planned to dump soil samples into the mini-lab intakes from a height of 10 centimeters, about 4 inches. Renno says winds of up to 11 mph are expected much of the time at the Phoenix landing site during the three-month main mission, which begins with arrival May 25, 2008.

“We calculated that if you deploy the soil 10 centimeters above the instrument intake, most of the particles will be blown away and will not fall inside the instrument,” Renno says. “So now we want to test that in the lab to see if the calculations are really true.”

## On the Web

A video of the AOSS experiments and a NASA animation of the Phoenix probe's descent and landing on Mars is available at:  
<http://www.umich.edu/news/Vid/Mars.mov>

For more information about the Phoenix mission, visit  
<http://phoenix.lpl.arizona.edu>

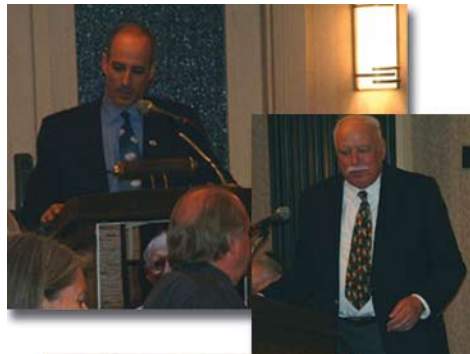
# KUHN SYMPOSIUM

CONTINUED FROM PAGE 1

The afternoon's symposium, which was held in conjunction with the Michigan Geophysical Union annual meeting, was followed by a dinner and roast at Weber's Inn that was attended by more than 75 people.

After dinner and kind words from Dave Munson, Robert J. Vlasic Dean of Engineering, the real fun was kicked off by AOSS Chair Tamas Gombosi. In true "roasting" style, he was followed by Paul Gross, '83, Professor Emeritus Stan Jacobs, Professor Andy Nagy, John Olivero, '70, Professor Emeritus Roland Drayson, '67, Professor Jerry Keeler and Associate Chair Perry Samson. And, in the true spirit of collegiality and fairness, Bill was given his two minutes for rebuttal!

A good time was had by all as we bid him farewell. Although, to our delight, Bill is still hanging around the department. We hope it's for a long time to come.



## On the Web

A complete catalog of pictures from the Kuhn Symposium, Dinner and Roast are online at: [http://aoss.engin.umich.edu/events/06-07\\_events/Kuhn-07/images/index.html](http://aoss.engin.umich.edu/events/06-07_events/Kuhn-07/images/index.html)

# AOSS Happenings

Last issue's baby boom has become a stellar nursery bursting with fresh futures and radiant possibilities.



Introducing Liana Zhou, born June 20, 2007, to Liang and Cheng Zhou. At birth, Liana was 6 lbs 10 oz. Such a happy baby.



Then we have: Elliot Roland Kuranz Parker, born March 28, 2007, to Carolyn and Jonathan. Elliot joined us at 8 lb 2 oz and 20 inches.



Keegan Thomas Bell, born June 23, 2007, to Anna de Jong and Jared Bell, came in (or should that be out) at 9 lbs, 21 inches and doesn't seem quite so pleased to be here.



Finally, presenting Anthony Wen Jin, born to Xia Cai and Rui Jin on May 4, 2007. Anthony was 7 lbs 5 oz, 19.5 inches.

***One girl, three boys, seems about even.***

## **Grandmama Gallery**



### **Grammy Moon and Isaac Peter Moon**

Isaac was born on May 19, 2007, to Brett and Nancy Moon. He weighed 9 lbs 1 oz and was 21.5 inches long. I expect big brothers Max, Edward, and Aidan are thrilled to be adding to the team, but I wonder if big sister Melissa was hoping for a little help on her side.



### **A peacefully sleeping first grandchild for Bobbi Walunas**

Zofia Anna Brzezniak was born on July 17, 2007, to Theresa Walunas and John Brzezniak, and weighed in at 6 lbs 4 oz. Grandma says Zofia "stretches to a respectable 20 inches. Her dad described her as 'pink and snuggly.' Grandma and Grandpa are just tickled pink."

# Meeting the Work Force Needs

Recently the National Academies Press published *Building a Better NASA Workforce: Meeting the Workforce Needs for the National Vision for Space Exploration*, which was authored by the Committee on Meeting the Workforce Needs for the National Vision for Space Exploration, National Research Council. While the entire publication is highly interesting, recommendation 5 is very relevant to AOSS, as hands-on classes are becoming the cornerstone of our academic program.

*"Recommendation 5: Support university programs and provide hands-on opportunities at the college level. The committee recommends that NASA make workforce-related programs such as the Graduate Student Researchers Program and co-op programs a high priority within its education budget. NASA should also invest in the future workforce by partnering with universities to provide hands-on experiences for students and opportunities for fundamental scientific and engineering research specific to NASA's needs. These experiences should include significant numbers of opportunities to participate in all aspects of suborbital and Explorer-class flight programs and in research fellowships and co-op student assignments."*

## On the Web

Read the complete report online at:  
[http://books.nap.edu/catalog.php?record\\_id=11916#toc](http://books.nap.edu/catalog.php?record_id=11916#toc)

# Tornado Paths via Google<sup>®</sup> Maps and Google<sup>®</sup> Earth

Just in time for the 2007 tornado season, AOSS, via Prof. Perry Samson, started a new website for exploring tornado paths. The paths of all tornadoes from 1950-2004 (information on years 2005-present are being added) can be viewed at: <http://climate.engin.umich.edu/tornadopath>.

Click on one of the tornado icons and you will see a place to add information and a link so you can "Fly the Path", which throws you into Google Earth<sup>®</sup> for a 3D tour of the tornado's path (and location of nearby schools).



For additional information, check out the *USA Today* blog at: [http://blogs.usatoday.com/weather/2007/04/tornado\\_mashups.html](http://blogs.usatoday.com/weather/2007/04/tornado_mashups.html). Or, in Spanish at: <http://www.vistasatelite.com/blog>.

# Student-industry Partnership Sends Local Company into Orbit

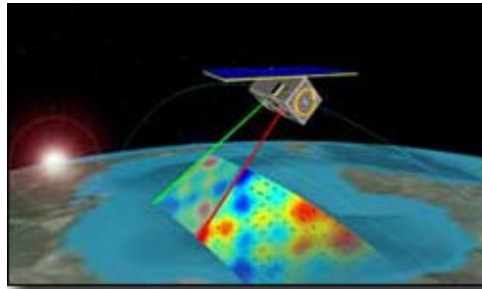
By Nancy Davis, Ross School of Business

It is a match made in innovation heaven, backers say, when small companies that struggle with manpower and funding issues are matched with graduate students who hunger for practical application of their education and talents.

MWinds, a collaborative project between U-M engineering and business students and Michigan Aerospace Corporation (MAC), has produced one such match. Students in Professor Thomas Zurbuchen's unique multidisciplinary class recently completed a year's worth of research on a revolutionary weather forecasting satellite system for MAC, a U-M spinoff company.

MAC, in Ann Arbor, is a leader in the development of light detection and ranging (lidar) and related optical systems for atmospheric measurement. The firm was interested in the possibility of putting lidar systems on spacecraft for altitude-dependent detection of winds to forecast severe weather, but needed help developing the research. That's where Zurbuchen's class came in.

The class worked as a system study group and addressed problems of interest to and defined by MAC with a specific application in mind.



**The Michigan Aerospace Corp., a leader in the development of light detection and ranging (lidar) and related optical systems for atmospheric measurement, is an AOSS spinoff company. (Image courtesy MWinds)**

The real-world experience for his students is just one benefit of the program, Zurbuchen says, adding that he is excited about the future benefits to Michigan's economy when even more student-corporation partnerships are formed.

"What I find unique is the possibility of using the class experience to help an innovation startup company in Michigan," he says. "The Michigan Aerospace Corporation estimated that the class did in one year what it would have taken them three years to research. What the students got was the best education they could get working with a real company and real deadlines in a real-time atmosphere.

"With this experience under their belts, their value in the aerospace industry

has increased exponentially." Zurbuchen's selection of MAC, which was formed in 1996 to commercialize the technologies of U-M's Space Physics Research Lab, also was ideal. Working closely with MAC CEO Peter Tchoryk and his team, the students put in many hours researching, conducting market assessments and creating new technology to enhance hurricane forecasting.

Tchoryk, who holds a U-M master's degree in engineering, was impressed with the results of the partnership. "The quality and volume of work produced by the students was exceptional. The end result on the technical side was a high-fidelity point design with all the solid engineering and trades that one would expect from an aerospace company," he says.

"From the business side, the students created a business model that provided a comprehensive survey of potential applications and revenue projections for each," Tchoryk says. He added that the MWinds project is active and underway at Michigan Aerospace with customers on both the civilian and defense side being pursued.

# Make a Michigan Difference Today



Your tax-deductible gift to AOSS will provide opportunities for students and keep our programs strong. AOSS strives to offer our students the best possible educational and research opportunities. Your gift to the Department will enable us to make awards to AOSS students who have financial need, are outstanding students or have exemplified exceptional leadership and character. The Department has been working hard to make the recently established Thomas M. Donahue Memorial Student Fund an endowment that will benefit AOSS students for years to come. We are very close to the goal and would encourage you to be a part of a long-lasting endeavor to assist others in their academic endeavors.

Please use the form below to make a Michigan Difference today.

## **Thomas M. Donahue Memorial Student Fund**

Enclosed is my gift of \$\_\_\_\_\_ for the Thomas M. Donahue Memorial Student Fund.

Name(s) \_\_\_\_\_

Address \_\_\_\_\_

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Daytime Phone ( ) \_\_\_\_\_ Email \_\_\_\_\_

Please do not send acknowledgment note to the Thomas M. Donahue Family.  
(The amount of your gift will remain confidential.)

Make check payable to: University of Michigan

Send your donations to:  
Thomas M. Donahue Memorial Student Fund  
Department of Atmospheric, Oceanic and Space Sciences  
Room 1521C SRB  
2455 Hayward Street  
Ann Arbor, MI 48109-2143

*Questions? Contact Mary Nebels-Frumkin at [maryln@umich.edu](mailto:maryln@umich.edu)*