ASTROPHYSICAL AND PLANETARY SCIENCES

Fall 2013 University of Colorado Boulder

From the Desk of the Chair

APS Alumni, Colleagues and Friends,

As I write, we have just welcomed our two new faculty members, Assistant Professors Julie Comerford and Jean-Michel Désert. Both are observers who will make their research homes in CASA. Julie studies "dual" black holes in recently merged galaxies, while Jean-Michel studies exoplanets and their atmospheres using transits and is a member of the Kepler team.

We have also hired the first faculty member in connection with the move of the National Solar Observatory headquarters from Tucson to Boulder. Ben Brown, who got his Ph.D. from CU in 2009 (working with Juri Toomre) and has since been at the University of Wisconsin-Madison as an NSF Fellow (working with former APS professor Ellen Zweibel, among others) plans to arrive in Fall 2014, after spending a year at the Kavli Institute for Theoretical Physics. One aim of Ben's computational studies of turbulent dynamos in the Sun is to understand the origin of the 11-year solar cycle.

Speaking of NSO, the observatory's relocation to Boulder is well underway, with the first group of scientists arriving this summer. As part of our bid, CU promised several faculty lines, 6 graduate fellowships and 2 postdoctoral fellowships. We will be conducting the second faculty search this fall, so stay tuned for the outcome in next year's newsletter. We filled the first two graduate fellowships last spring, and plan to offer the next two and the first of the postdocs this coming year.

The upgrade of Fiske Planetarium is nearly complete, with a gala grand opening set for October. Our old Zeiss projector, "Fritz," has been installed in the lobby, where it will form the centerpiece of an exhibit on planetariums through the ages. See the accompanying article to learn more about the spectacular capabilities of our new equipment!

We've also seen some changes next door at Sommers-Bausch Observatory. Keith Gleason retired as observatory manager after 30 years of service. At a party "under the dome" in June, outgoing SBO director Erica Ellingson and others recounted Keith's many accomplishments, and set them in the context of SBO's history. Did you know that SBO was featured on the cover of Sky & Telescope Magazine 50 years ago, when it first opened? One of Keith's pet projects was the heliostat, which has now been named in his honor. Fabio Mezzalira has taken over as observatory manager, with Seth Hornstein serving as director.

On the research side, there is more going on than I can possibly recount. Of particular note is CU's joining the Sloan Digital Sky Survey (SDSS-IV) consortium as a full institutional partner; read on in the newsletter to find out more.

Let me conclude by once again urging you to keep in touch. You are always welcome to visit. And if you need extra inducement, the new Fiske is definitely worth seeing!

Sincerely,
Mitch Begelman
APS Department Professor and Chair

Congratulations to our 2012-2013 Graduates!

Bachelor of Arts

Christopher Anaya
Evan Buzzell
Zachary Collver (ΦBK)
Dalton King
Michael Klear (ΦBK)
Jeramy Lewis
Joel Mendez
Rebecca Nichols
Marcus Piquette (ΦBK)
Brandon Poulliot
Stacey Rugenski
Gregory Sandras
Tatiana Taylor
Shelbe Timothy
Helen Yamamoto

Doctor of Philosophy

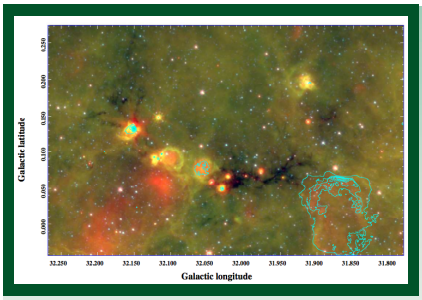
Kyle Augustson
Cara Battersby
Adam Ginsburg
Seth Jacobson
Juthika Khargharia
Tyler Mitchell
Nicholas Nelson
Devin Silvia
Samuel Skillman
Benjamin Zeiger

Find us on Facebook

www.facebook.com/aps.cu.boulder

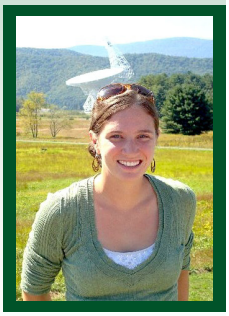
Recent Graduate Student and Postdoctoral Awards

Cara Battersby	Chance Irick Cooke Graduate Fellowship
Eric Coughlin	Carl Hansen Graduate Fellowship
Anthony Harness	NASA Space Technology Research Fellow
Briana Ingermann	APS Award for Excellence in Teaching
Julia Kamenetzky	Ray Mace Smith Graduate Fellowship
Susanna Kohler	Chancellor's Graduate Fellowship for Excellence in STEM Education
	R.N. Thomas Award for Outstanding Research in Astrophysics
Chris Moore	NASA Space Technology Research Fellow
Emily Levesque	Hubble Fellowship at CU



An IRDC in the Galactic plane as seen by the Spitzer Space Telescope. Yellow, orange and red colors trace regions of previous and current massive star formation.

Cara Battersby is the winner of the 2012-2013 Chance Irick Cooke Graduate Fellowship. Cara defended her Ph.D. thesis in April, and she will be starting a postdoc at the Harvard Smithsonian Center for Astrophysics (CfA) in Cambridge, Massachusetts in October. Cara has been studying the properties of Infrared Dark Clouds (IRDCs) — extremely cold and dense clouds in the Galaxy that are thought to be where massive stars and star clusters are born.



Cara has used data from a variety of instruments during her tenure at CU, such as NASA's Spitzer and Herschel Space Telescopes, the Caltech Submillimeter Observatory Bolocam camera, the Very Large Array radio telescope, and the 100-meter Green Bank Telescope. Her work on IRDCs sheds light on the physical and chemical conditions needed to form stars, star clusters, and planetary systems.

In addition to her astrophysical research, Cara participates in a number of athletic extracurriculars such as skiing, rock climbing, and competitive ultimate Frisbee. She also finds time for humanitarian activities such as volunteering at the Boulder Safehouse (SPAN).

Professor Ted Snow Retires

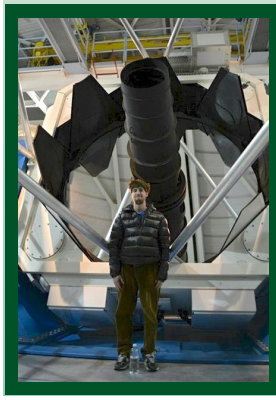
In May 2013, long-time **Professor Theodore (Ted) Snow** retired from APS and will now move to Emeritus Professor status. Ted was hired from Princeton in 1979 as an Assistant Professor in the CU Department of Physics & Astrophysics. His ultraviolet space astrophysics program was housed in the Laboratory for Atmospheric and Space Physics until 1985, and then in the Center for Astrophysics and Space Astronomy (CASA). In 1980, Ted and six other astrophysicists moved into the newly organized Department of Astrophysical, Planetary and Atmospheric Sciences (APAS), the predecessor of our current APS Department. For the past 34 years (1979-2013) Ted has been a mainstay of our observational astronomy faculty, teaching a wide range of undergraduate courses and writing several astronomy and physics textbooks with student guides and web applications. Ted was APS representative on the Boulder Faculty Assembly, and was particularly active with campus student-athlete policy as Chair of the BFA Athletics Committee.

Ted supervised 11 graduate Ph.D. theses in studies of the Be stars, interstellar medium, astrochemistry, diffuse interstellar bands, and ultraviolet/optical/infrared spectroscopy of dust grains and molecules. As of July 2013, Ted is the author of 224 refereed publications, including two major review articles in Annual Reviews of Astronomy & Astrophysics: "The Violent Interstellar Medium" (McCray & Snow 1979) and "Diffuse Atomic and Molecular Clouds" (Snow & McCall 2006). In addition to being Principal Investigator on the UV Rocket Program in CASA, Ted served as CASA Director from 1986-1996 and organized the move of CASA's Astrophysical Research Laboratory to its current east-campus site.

The APS Department is establishing the Theodore Snow Undergraduate Scholarship, awarded to an undergraduate in our astronomy major program to encourage them in their studies and to enter research in astrophysics. We believe this will be a fitting way to remember and honor Ted's commitment to undergraduate teaching and his excellence as a mentor and research supervisor to students. We encourage donations from Ted's friends, family, former students, and colleagues. Your contribution can be made as a tax-deductible donation to the University of Colorado Foundation, noting the Ted Snow Undergraduate Scholarship in your transmittal letter or in the memo space of your check. You can donate by check, credit card, or online, using the CU Foundation link:

http://www.cufund.org/guide-to-giving/what-to-give/cashcheckscredit-card/

Benjamin Gerard, a physics and astrophysics major, recently won the Wesley Undergraduate Scholarship. Ben is an excellent student and a musician, routinely playing live music in venues around Boulder. Ben started his research career with a National Science Foundation fellowship at Berkeley, working on variable stars. For the last year, he has been working in APS with Prof. Jeremy Darling on a study of the molecular gas in the Andromeda Galaxy. Ben's work is part of a large program to measure the real-time motion of Andromeda to determine whether the Andromeda Galaxy is on a collision-course with the Milky Way. Ben plans to present his work at the winter meeting of the American Astronomical Society.



Recent Undergraduate Student Awards

Zachary Collver	J. Tour Scholarship
Ryan Dewey	Wesley Undergraduate Scholarship
Kati Eason	Bartkus Family Scholarship
Erin George	Achievement Rewards for College Scientsts (ARCS Foundation)
Benjamin Gerard	Wesley Undergraduate Scholarship
Shelbe Timothy	J. Tour Scholarship

Faculty Awards

Dan Baker	American Geophysical Union Van Allen Distinguished Lecturer
	Asia-Oceania Geophysical Society Distinguished Solar-Terrestrial Physics Lecturer
Bob Ergun	Elected Fellow of the American Geophysical Union
Kevin France	NASA Nancy Grace Roman Technology Fellowship in Astrophysics
Jason Glenn	Arthur C. Clarke Award (as part of Herschel's SPIRE team)
Seth Hornstein	ASSETT Award of Excellence as an Outstanding Teacher for Technology in Teaching

APS Continues to Excel in Teaching

Seth Hornstein is the latest APS faculty to receive a teaching award. This spring he received an Award of Excellence as an Outstanding Teacher for Technology in Teaching. His students particularly appreciated his "weekly Mastering Astronomy online homework that included tutorials that supplemented what we had already learned in class" and "use of D2L as a way to further communicate with students." Seth has been a departmental leader and resource for using these teaching tools (and more) in large classes, as well as orchestrating the department's use of Learning Assistants. Seth will continue in these teaching roles as he becomes Director of Sommers-Bausch Observatory this fall.

Other faculty recently recognized specifically for teaching include:

Fran Bagenal	CU's Faculty Excellence Award for Advancing Teaching and Learning through Technology
Doug Duncan	Astro. Society of the Pacific's Emmons Award CU's "Best Should Teach" Award
Erica Ellingson	CU's Marinus Smith Award
Nick Schneider	Boulder Faculty Assembly Teaching Award
Mike Shull	Boulder Faculty Assembly Teaching Award President's Teaching Scholar
Juri Toomre	CU's SOAR Teaching Award

CU Joins the Sloan-IV Project

Starting July 1, 2013, the APS Department has joined the SDSS-4 project, the Fourth Sloan Digital Sky Survey. This six-year, $59M survey will be carried out at the 2.5m Sloan Survey Telescope at Apache Point Observatory (APO), the premier astronomical facility for wide-field spectroscopic surveys. The project includes new instruments that will survey stars, galaxies, and quasars (large black holes at the centers of galaxies).

The three major SDSS-4 science projects include unraveling the cosmological mysteries of "dark energy", measuring properties of stars in the Milky Way, and probing galactic structure and kinematics.

(1) eBOSS (Extended Baryon Oscillation Sky Survey)

This survey of galaxies, quasars, and intergalactic matter will measure the expansion history and structure in the universe out to redshifts z = 3, including the uncharted realm between 7 to 11 billion years ago. Spatial patterns in the clustering of galaxies bear the imprints of "Baryon Acoustic Oscillations", remnants of cosmological fluctuations and sound waves that triggered the development of structure in the early universe. Baryon oscillations can be used to probe properties of dark energy and the mass-energy content of the universe.

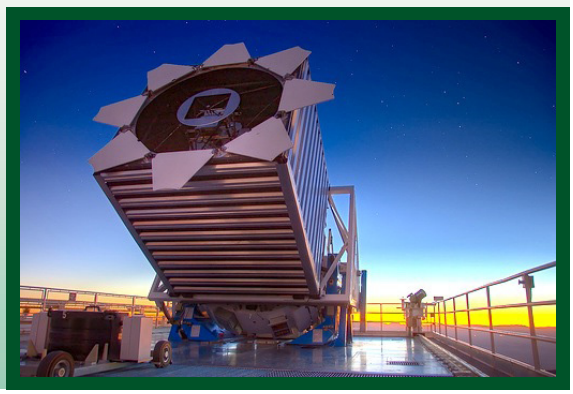
(2) APOGEE-2 (APO Galactic Evolution Experiment 2)

This infrared spectrographic survey will probe the distribution, dynamics, and chemistry of stars, and explore the formation and evolution of the Milky Way galaxy and our two companion galaxies, the Large and Small Magellanic Clouds. It will examine the Milky Way's disk, bulge, bar, and halo, as well as streams of stars stripped out of dwarf galaxies as they fall through the Milky Way halo.

(3) MANGA (Mapping Nearby Galaxies at APO)

MANGA is an integral-field spectroscopic study of the internal structure and formation history of 10,000 nearby galaxies. MANGA will measure precise velocities of stellar motions and chemical abundances for a large range of galaxy masses, types, and environments.

The department's involvement in the SDSS-IV project will enhance CU's scientific reputation and offer exciting new research projects for APS students and faculty. The survey will also be a recruiting tool for graduate students and prize postdocs and will produce valuable data for research projects and senior honors theses by our undergraduates.



Remodeled Fiske Planetarium to Open in October

Fiske Planetarium, closed since January, is about to reopen — and when it does, it will be the most technologically advanced planetarium in the world.

For nearly 40 years the big, mechanical Zeiss projector, nicknamed "Fritz" after the man who installed it, has shown the stars to thousands of visitors. Fritz has now been retired to the lobby, and replaced with a brand-new Japanese projector called Megastar. Incredibly, Megastar is so small that it can ride in a business class airplane seat, yet it projects 20 million stars (compared to Fritz's 6000). You will actually be able to bring a pair of binoculars into the theater and see individual stars when scanning the Milky Way.

Even more spectacularly, the entire planetarium dome will become a giant digital video screen, with resolution similar to IMAX but stretching 360 degrees all around — the equivalent of 40 simultaneous Blu-ray players all working at once. To show the clearest image, a new interior dome was also installed, and we are thankful to Hewlett Packard for donating the powerful computers needed to run the system.

Fiske will be open every Saturday and Sunday with a variety of all-dome movies, much like the 29th St. cinemas. Subjects will range from super volcanoes to black holes and from family programs to art and music. Visit http://fiske.colorado.edu to see the latest schedules and information about the grand openings.

The popular weekend-night laser shows (like "Laser Floyd") will continue to be shown on an upgraded laser system. Private and corporate events will also continue. Contact Fiske for details.

You can make a gift to APS easily through the CU Foundation at http://aps.colorado.edu/giving.html or the APS website at http://aps.colorado.edu/. If you have questions or need further assistance, contact Barbara Perin, Sr. Director of Development, at barb.perin@colorado.edu or (303) 541-1447.

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