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LINKS

- Attend the **Alumni Dinner** at MIT, Nov. 10: ssp.org/dinner
- **Update your info** and browse the database of alumni and faculty: ssp.org/database
- Donate securely to the **2013 Annual Fund**: ssp.org/donate
- Join the **Facebook group** (search for "SSP Alumni")
- Tell your **own story** (see back page): ssp.org/mySSPstory

EXPANDING THE IMPACT

"Impactfulness." That's what one foundation looks for in programs they support. Do participants find themselves transformed by the experience? For 54 years the Summer Science Program has had that kind of profound effect. That's why alumni still care enough to support it today.

But there is a second type of impact: does SSP continue to benefit its alumni after they go home? In decades past we had only the *Universal Times* in the mail once a year, and the reunion in Ojai. Now every class stays in close contact with one another through their college years and beyond. Cross-

pollination happens on the Facebook alumni group – now approaching 600 members – and on the searchable database at ssp.org/database.

Notwithstanding our multidimensional diversity, SSPers have a lot in common. And the benefits of the SSP network are not limited to alumni and former faculty; our extended family includes parents, guest speakers, host campus staff, really anyone who cares deeply about STEM education.

To increase SSP's benefit to you, connect. Come to Open House Day in July, or sooner: attend the **SSP Alumni Dinner** at the stunning **MIT Media Lab**, on Saturday, November 10th.



Dr. Maarten Schmidt poses with most of the Class of 2012 at Westmont's Open House Day

ACADEMIC DIRECTOR REPORTS

SSP at Westmont College

by Dr. Tracy Furutani

At Westmont this past summer, all students completed the Near-Earth Asteroid (NEA) orbital determination (OD). Further, three students performed the OD twice, comparing the Laplacian method to the Gaussian. Asteroid observations from all twelve teams will be submitted to the Minor Planet Center.

Our 14-inch Meade LX200 telescope (and its camera) again performed well, capturing images of exotic NEAs, such as 2002 AM31 which had its closest encounter with Earth on July 12! Westmont Physics Prof. Tom Whittemore taught us how to use the 24-inch DFM Keck telescope. Students used cloudy nights to test the CCD camera, and learn how to request remote images from the

(Continued on page 6)

SSP at New Mexico Tech

by Dr. William Andersen

I am pleased to report a successful program, SSP's tenth at New Mexico Tech, my fifth on the faculty and second as Academic Director. This year all students had completed calculus, physics, or both, allowing Associate Academic Director Dr. Ed Schmidt and me an even-faster-than-usual dive into the academics, starting with an assignment handed to students as they stepped off the bus from the airport!

SSP encourages teamwork, but most high schools discourage students from studying together. So they arrive without knowing where the line falls between collaboration and plagiarism. This group embraced collaboration a little too enthusiastically at first. While always careful to offer attribution, some of their homeworks started to

(Continued on page 6)

2012ERS SAY

"I learned who I am, and who I am not, and who I hope to be."

—Andrea Smith

"Surprisingly the fact that I couldn't do most of my homework on my own did not discourage me but boosted my confidence, as it showed me that I can solve problems I never thought of being able to solve."

—Anna Apsit

"SSP has made me a better scientist, friend, and person."

—Lindsey

Whitesides

WELCOME TO THE FAMILY!



Students and faculty at Westmont College



Students and faculty at New Mexico Tech

2012 FACULTY

Westmont Campus

Academic Director:

Dr. Tracy Furutani '79

Associate AD: Dr. Adam Rengstorf

Site Director: Barbara Martinez

Lead TA: Rebecca Rapf '07

TA: Joanna Robaszewski '08

TA: Magnus Haw '07

TA: Gabriel Cadamuro '07

New Mexico Tech Campus

Academic Director:

Dr. William Andersen

Associate AD: Dr. Edward Schmidt

Site Director: Leslie Clark

Lead TA: Benjamin Knudsen '06

Senior TA: Aaron Bauer '06

TA: Elaine Johnson '05

TA: Hillary Walker '06

COLLEGE CLASSES OF 2016

Brown	Kallan Berglund, Marisa Millenson
Caltech	Laksh Bhasin, Kristin Eliason, Eric Gorlin, Sam Holo, Ariel O'Neill, Pato Rall
Cambridge	Ioana Madalina Plesca
Carnegie-Mellon	Ling Gu, Jeremy Hyde
Case Western Reserve	Greg Tobar
Columbia	Bridget Neal, Ming Zhao
Cornell	Natasha Zella
Harvard	Imani Bunn, Ana-Maria Constantin, David Ding, Tudor Giurgica-Tiron, Duligur Ibeling, Bowen Lu, Indira Puri, Lucian Wang, Milly Wang, Hirohisa Yamada
Harvey Mudd	Kennedy Agwamba, Drew Schmitt
Johns Hopkins	Edric Tam
MIT	Leyatt Betre, Laura Breiman, Kaylee Brent, Jorrie Brettin, Duy Anh Doan Nguyen, Virup Gubba, Priya Kalluri, Jahnvi Kalpathy, Keertan Kini, Anthony Mark, Pratheek Nagaraj, Katy Pan, Dimitra Pefkou, Isabella Sanders, Marissa Stephens, Phong Vo
NM State	Cindy Yeh
Pennsylvania	Lawrence Li, Renee Sima
Princeton	Zach Atkins, Ahsan Mehmood, Pathik Shah, Angela Zhou, Ellen Zhou
Stanford	Will Connors, Travis Le, Anelisse Peterson, Alanna Tempest, Deger Turan, Ajit Vakharia, Kevin Wu
UC Berkeley	Katherine Hsu
Univ. of Chicago	Jasmine Mithani, Aneesa Sonawalla
Univ. of Edinburgh	Mireia Ibanez
Univ. of New Brunswick	Linna Meng
Univ. de Los Andes	Maria Remolina Gutierrez
Yale	Jane Balkoski, Brian Lei, Jason Liu, Carsten Peterson, Stephany Rhee, Connie Wang, Mohan Yin, Tianshu Zhu



The Adventure Begins: arriving at NM Tech from the airport



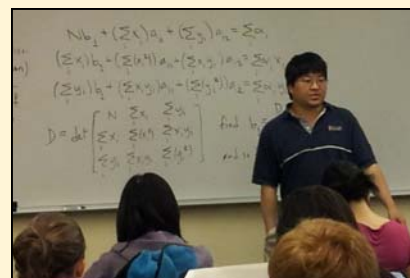
Talent Show time in Socorro!



The computer lab at Westmont



A team ready to observe with SSP's Meade 14"



Dr. Fu poses with matrices

SSP TURNS 55: EVENTS, OPPORTUNITIES

2013 will be the 55th Summer Science Program! We're planning several opportunities to celebrate with alumni, students, faculty, friends of SSP, family, and guests, starting with the first annual **Alumni Dinner**, Nov. 10th at the MIT Media Lab (info at ssp.org/dinner). Prof. Sara Seager will give a guest lecture on her exoplanet research.

You can meet the Class of 2013 on campus at Open House Day (July 6 at New Mexico Tech, July 13 at Westmont College). November 2013 will see the Alumni Dinner move to the Caltech campus.

Meanwhile, the Facebook alumni group is always open for virtual meetups and sharing.

TRUSTEE ELECTION RESULTS

The annual election of SSP Trustees was held this spring by online ballot, emailed to all alumni and former faculty for whom we have email addresses. (If you didn't get one, email sspalum@ssp.org.)

Results were announced at both Open House Days. Incumbent Trustees **Dan Seligson '71** and **Richard Mathews '77** were re-elected. **Anna Heinz '98** TA '06-'08 SD '11 was elected.

WESTMONT COLLEGE AD REPORT

(Continued from page 1)

PROMPT telescopes in Chile.

In a change to the standard curriculum, we gave fewer lectures in calculus, and more on statistics, image processing and astrometry, the latter two topics ably handled by Associate Academic Director Dr. Adam Rengstorf. Programming was team-taught by Executive Director Richard Bowdon '74, former AD Martin Mason, and Teaching Assistants Magnus Haw '07 and Gabe Cadamuro '07.

Renovation of the campus Dining Commons presented a challenge for Site Director Barbara Martinez. She organized not only daily continental breakfasts in the dorm, but also catering of dinners every weekend and post-beach Wednesday.

As ever, the hardworking TAs were crucial to the success of both the academic and social aspects of SSP. TA Haw (and AAD Rengstorf) restored working software in the dome PC after it

mysteriously crashed in the last week. TA Cadamuro kept the Question of the Day (QOD) tradition alive with some fiendish brain-teasers for the students. TA Joanna Robaszewski '08 led math tutorials, and Lead TA Becky Rapf '07 organized the observing schedule and collated an impressive observation record. They all took turns in organizing "mandatory fun" for the students, from soccer to swing dancing (with help from Trustee Dr. David Pierce). Each TA gave a lecture about his or her own research.

On our annual field trip to Caltech, Prof. Julie Kornfield, for the seventh year in a row, talked about her research and led a tour of her lab. Griffith Observatory Director Edwin Krupp '61 led the most extensive tour of the facility I have ever had the pleasure to take. We visited the Kavli Institute for Theoretical Physics at UC Santa Barbara, the Los Cumbres Observatory Global Telescope project, and the Jet

Propulsion Lab, led by former AD Dr. Stuart Stephens, with Van Snyder '69, Denis Elliott '63, Robert Haw, and Tracy Neilsen. Students will long remember JPL's working duplicate of the Mars lander Curiosity, two weeks before it landed on Mars.

Just after the orbit determinations were completed, we were pleased to welcome Dr. Amy Barr '94 (now Planetary Science Prof. at Brown) and Southwest Research Institute researcher Dr. Luke Dones. They taught students how to project their asteroid's ultimate fate: most will leave the solar system or crash into the Sun, but for others, a collision course with Earth is a distinct possibility.

I am grateful to Westmont Prof. Warren Rogers '76; Marcy Fowler, Victor Tsai '98, and Steve Vass at Caltech; Daniel Hone and Lars Bildstein at Kavli; Rachel Ross at LCOGT; and John Briggs '76 for remote images. They made the summer remarkable for all of us.

NEW MEXICO TECH AD REPORT

(Continued from page 1)

resemble: "answer 1 is courtesy of John, answer 2 is courtesy of Jane," I am exaggerating, of course, and we did get it straightened out about mid-program. Students learn a lot more than astronomy at SSP!

Observing Near-Earth and Potentially Hazardous Asteroids keeps SSP both motivating to students and useful to the astronomical community. I was able to find six NEOs for which the Minor Planet Center needs observations, were visible in the evening, and bright enough for our telescopes (17th magnitude). By Departure Day, our students had contributed 30 new observations to the MPC database.

We taught the Gaussian method of orbit determination, using a geometric approach (due to Feynman) that enabled me to solve the Kepler problem without calculus. All but one student

achieved convergence, and reasonable orbits were obtained for five of the six asteroids. A few students explored the sensitivity of the OD results to the proximity of the asteroid to its perihelion.

I handed out excerpts from the American Institute of Physics Style Manual to guide each team in writing their OD reports, which might be an SSP first.

As mentioned, SSP is about a lot more than asteroids. So many alumni and friends contribute time and talent to make each SSP an intense and meaningful experience. Here is a partial list:

Steve Cotler '60 recruited fabulous guest speakers as usual. John Briggs '76 arranged our insider tour of Apache Point / Sunspot. Site Director Leslie Clark organized our trips to Magdalena's Old Timer's Reunion and Elephant Butte Reservoir. We also visited Magdalena Ridge Observatory, Trinity Site, the

Very Large Array, Albuquerque Old Towne, and an archeological dig. Faculty and students enjoyed a swing dance at Socorro town square, a game of assassin, Ultimate Frisbee, and soccer. We were pleased to welcome 34 visitors for Open House Day, a record!

Dr. Amy Barr '94 and Dr. Luke Dones arrived in the last few days to take us way beyond Gauss and Laplace, teaching students to apply chaos theory to orbits. Each team gave a short presentation on the long-term fate of their asteroid. Dr. Dan KlingleSmith continues as the go-to guy at Etschorn Observatory.

I've already mentioned Ed Schmidt and Leslie Clark, both of whom were unfailingly dedicated in service to the students. Last but certainly not least: the real work horses (very smart horses), our wonderful Teaching Assistants: Hillary Walker '06, Elaine Johnson '05, Ben Knudsen '06, and Aaron Bauer '06. Thank you!

DONATION FORM

You can help inspire 72 gifted teenagers to reach their amazing potentials. Return this form with your check, or donate online using a credit card at www.ssp.org/donate. Send any questions to sspalum@ssp.org.

\$_____ ☐ \$1000 ☐ \$500 ☐ \$250 ☐ \$100 ☐ \$50 ☐ \$25

Credit to: _____ ☐ alum ☐ parent ☐ faculty ☐ friend

Allocate to: ☐ unrestricted gift (or _____%)
☐ SSP Scholarship Endowment (or _____%)

Please contact me regarding:
☐ President's Council (annual pledge)
☐ Legacy Society (bequest / estate planning)
☐ SSP Benefactors (Endowment pledge)

SSP c/o Laura Kang Ward
 436 Jackson Ave
 Livermore, CA 94550

Send corrections to your mailing or email addresses to sspalum@ssp.org, or mark on the back of this form.

2012ERS SAY

"SSP has changed me so profoundly that I don't even remember what I was like before."
 –Rafael Musa

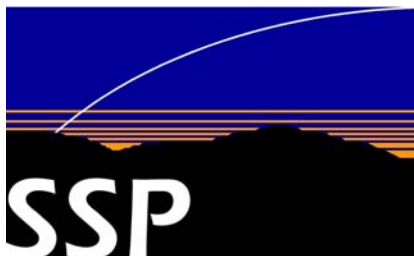
"For once, 'school' became fun. 'Peers' became friends. 'Work' became learning."
 –Christopher Goes

"I arrived as a very well-honed and focused academic machine, and left driven to become a bold scholar."
 –Meg Panetta

2012 GUEST LECTURE SERIES

WESTMONT	NM TECH
Dr. Margarita Marinova , NASA Ames Research Center/BAER Institute - "From Antarctica to Mars: Measuring and Modeling Ground Ice"	Mika McKinnon '00 , SyFy Network - "Disaster Science Fiction"
Dr. Larry Sverdrup , Trex Enterprises Corporation - "Mad? Science!"	Dr. Larry Sverdrup , Trex Enterprises Corporation - "Mad? Science!"
Dr. Susan Jerian '79 , OncoRD, Inc. - "Fighting the War on Cancer One Medicine at a Time"	Dr. Penelope Boston , New Mexico Tech - "Caves: Exploring Life Underground from Earth to Mars and Beyond"
Dr. Steve Kilston , Interstellar Consultants - "The Ultimate Project: A Plausible Path to the Stars"	Dr. Eileen V. Ryan , New Mexico Tech - "Follow up and Characterization of Potentially Hazardous Asteroids using the MRO 2.4m Telescope"
Dr. Chad Higdon-Topaz , Macalester College - "Biological Swarms and their Mathematical Models"	Dr. Jerilyn Timlin , Sandia National Laboratories - "Unlocking the Secrets of Plaque Through Optical Superresolution"
Dr. Omer Blaes , UC Santa Barbara - "Astrophysics of Black Holes"	Dr. Tyrone Hayes , UC Berkeley - "From Silent Spring to Silent Night"
Dr. Wayne Iba , Westmont College - "Information and Computation: A Theory of Everything"	Dr. Patricia Henning , Univ. of New Mexico - "Mapping the Hidden Universe"
Dr. Steven Trainoff , Wyatt Technology Corp. - "Why Do Pharmaceutical Companies Care Why the Sky is Blue?"	Dr. Michael Dubson '73 , Univ. of Colorado at Boulder - "Physics vs. Lawyers: An Airline Crash Investigation"
Dr. Sigrid Close , Stanford Univ. - "Meteoroids and Asteroids: Micro to Macro Impactors"	

The Guest Speaker Series is underwritten by Sandia National Lab / Lockheed Martin



The Summer Science Program

Business Office:

108 Whiteberry Dr

Cary, NC 27519

PARENTS SAY

"The wonder of SSP is that it creates an environment in which feeling confused and overwhelmed is perfectly OK. Our daughter learned a new definition of success, one which has less to do with perfectionism and more to do with having the confidence to tackle a challenge."

—Gill Court

"SSP is what our daughter describes as paradise. We are truly in awe. It is a very special place indeed."

—Minh-Hang Chau

PRESIDENT'S LETTER

By Dr. Susan Jerian '79, President, SSP Board of Trustees

Dad drove the 1970 Ford Country Squire V8 station wagon down a rural road in Ojai looking for a school named Thacher. It was June 1979, really hot, and the smell of horses was heavy all around. As a teenager who loved math and science, the prospect of a summer doing astronomy excited me.

Next thing I knew, it was August and Dad was turning the car back into our driveway. The world and my place in it had changed forever, because in those six weeks something had shifted. "I am a scientist" said the voice inside of me ... and there was no turning back.

Each of us in the SSP family has a story. Often it is a variation on mine: SSP made us aware of our potential and gave us tools to realize it. So we still care deeply about this too-short experience we had as teens, years ago. We want to make sure that life-changing opportunity still exists for

teenagers today and tomorrow.

We often talk about the "secret sauce" of SSP. What makes these weeks so life-changing? Is it the academic challenge, the teamwork, the dedicated faculty, the dress code for dinner, no curfews, no laptops allowed, all of the above?

We call it "secret" because it is complex and still somewhat mysterious. Once we can document it fully, we can then spread it to more students in more places, perhaps using different research projects.

You can help, by sharing your own story about how SSP altered

your life trajectory. We will compile the responses and share them with alumni over the coming year of our 55th Anniversary. Please take a few minutes now: visit ssp.org/mySSPstory to tell your own story.

Thank you, and I hope to see you at an alumni event soon!

