

STARS NOTES

SCIENCE TEACHER ACCESS TO RESOURCES AT SOUTHWESTERN

SOUTHWESTERN

THE UNIVERSITY OF TEXAS
SOUTHWESTERN MEDICAL CENTER
AT DALLAS

STARS Notes
September 2003
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Reaching as high as the STARS NASA Brings Protein Crystallization and Microgravity Research To DFW-Area Students

A group of high school students from across the Dallas-Fort Worth area gathered at UT Southwestern Medical Center at Dallas on June 25 to participate in a protein crystal-growth experiment sponsored in part by the Texas Space Grant Consortium (TSGC) and Science Teacher Access to Resources at Southwestern (STARS).

After spending the morning conducting the experiment to grow the lysozyme protein crystals, the students observed growth of the crystals for two weeks. They then submitted essays detailing their understanding of the crystal-growth screen, interest in the subject matter, active participation in the experiment and understanding of structural biology.

The TSGC selected the winners of this essay competition to return to UT Southwestern on Aug. 4 for an "experiment loading day" with scientists from NASA, Marshall Space Flight Center, University of California Irvine, University of Alabama Huntsville and University of Texas Center for Space Research.

The opening greetings for the "experiment loading day" were given by U.S. Rep. Eddie Bernice Johnson (D-Dallas) and Dr. Mary Ellen Weber, associate vice president for commerce and public policy at UT Southwestern and a former astronaut. In addition, they participated with the students in preparing protein samples that may be transported to the International Space Station.

The microgravity environment of space provides ideal conditions for the growth of high-quality protein crystals, which are used by scientists to understand the molecular structures of proteins. This knowledge can help lead to new treatments for devastating diseases such as AIDS and cancer.



Emily Hall, a senior at Dallas Independent School District's Talented and Gifted Magnet High School and participant in the STARS Summer Research Program for Students, demonstrates procedures for U.S. Rep. Eddie Bernice Johnson (right) and Dr. Mary Ellen Weber.

In the event the next shuttle mission takes the samples to the International Space Station, each student will be invited to participate in a week-long visit to the Kennedy Space Center in Florida, which includes VIP invitations to watch the shuttle launch.

The students not only had the opportunity to load experiment samples but also rotated through two other sessions, a vapor diffusion experiment and some lab visits at UT Southwestern, which initiated the STARS program in 1991 to help improve science education in north central Texas.

This all-day workshop also included a teacher in-service on using the protein crystallization kit in the classroom. Every teacher will be supplied with the necessary equipment to run the experiment, with cost of the kits underwritten by TSGC and STARS. This teacher in-service will be repeated during the Fall Semester on Dec. 6. Call the STARS office for more information. Registration is limited.

Special Thanks to:

Congresswoman Eddie Bernice Johnson, U.S. Representative, 30th Congressional District
Mary Ellen Weber, Ph.D., Associate Vice President, Office of Technology Development, UT Southwestern
Greg Jenkins, Director, Engineering Team, University of California Irvine
Wendell Elrod, Project Scientist
Merle Myers, Staff Research Associate
Anna Holmes, Marshall Space Flight Center
Mark Fischer, TSGC Program Manager
Margaret Baguio, TSGC Education/Outreach Coordinator
Talia Jurgens, TSGC Administrative Associate



Ming Zhi, a senior at JJ Pearce High School in Richardson, participates in the vapor diffusion experiment overseen by Dr. Anna Holmes.

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Winners of Student Essay Contest and Participants in Flight Loading Day:

Joseph Arizpe
Ankur Bhatia
Elaine Bueti
Marlo Burks
Bryan Chiang
Anne Gan

Emily Hall
Joanna Jimenez
Sarah LaFountain
Sarah Lumpkins
Arin Lastufka

Erica Lastufka
Mary Katherine McElroy
Alaina C. McKee
Amanda Reyes
Eric Shah

Ambika Sharma
Meredith Sigler
Mark Stevens
Richelle Thomas
Ming Zhi

The Texas Space Grant Consortium (<http://www.tsgc.utexas.edu>) is part of the National Space Grant Program, which was established by Congress and implemented by the National Aeronautics and Space Administration (NASA) to ensure that the benefits of space research and technology are available to all Americans.

Spring 2003 STARS Events

All STARS activities and events are offered free of charge to teachers in the state of Texas.

STARS symposia consist of a series of lectures given by scientists and physicians currently doing research at UT Southwestern Medical Center and affiliated institutions. The science symposia and inservice sessions are excellent resources for teachers to learn about cutting-edge research in the biomedical sciences, to discover new classroom activities, and to obtain professional development credit at the same time. If you wish to attend any event, please pre-register by calling 214-648-9505 or visiting our online registration page at www.utsouthwestern.edu/stars/registration.html.

Mini-Symposium: Earth & Man - January 13, 2003

In Collaboration with the Dallas Museum of Natural History

Dinosaurs of Alaska by Tony Fiorillo, PhD, Curator of Earth Sciences at the Dallas Museum of Natural History

Snakes with Legs and Lizards in Amber: New Techniques for Studying Old Bones by Louis Jacobs, PhD, Director of the Institute of Earth and Man at Southern Methodist University

Melinda Ludwig commented that it was "interesting and well done." "Presentations such as these can create interest in the earth sciences for teachers with little or no background and can reinforce concepts for teachers who are already well-versed in the earth sciences."



Science in 3D.

Teacher Inservice: PaleoDay - February 1, 2003

In Collaboration with the Dallas Museum of Natural History



Hunting for shark teeth in Eagleford Shale

This Paleontology Workshop for Teachers at the Dallas Museum of Natural History was presented by members of the museum staff: Angela Burcham, Science Educator; Heather Finlayson, PhD, Paleontologist; Brian Barnette, Science Educator & Chief Naturalist; and Derek Main, Paleontology. The teachers experienced various activities, including some behind the scenes tours of the museum, a presentation on Prehistoric Texas, work in the Paleo Lab, activities such as "The Great Fossil Find" for use in the classroom, and a presentation on paleontology field work and lab preparation, which they put into practice by hunting for shark teeth in some Eagleford Shale.



Joyce Manny from Saldivar Elementary School learns how to properly clean a real fossil in the Dallas Museum of Natural History's Paleo Lab.

Kelly Yarbrough of Nathaniel Hawthorne Elementary said, "I enjoyed learning about fossil casts and going to the lab downstairs to see the fossil collections. I enjoyed learning the process of finding fossils, getting fossils out of rocks, and how to make molds. The program was fun, relaxing, and very informative."

Mini-Symposium: Poisons: Effects, Antidotes, & Detection - Mar. 3, 2003

The Pharmacology and Epidemiology of Poisoning in Adolescents by Greene Shepherd, PhD, Clinical Assistant Professor Emergency Medicine and Director North Texas Poison Control Center

Silly Toxic Things Kids Do...And How We Fix Them by Kurt Kleinschmidt, MD, Associate Professor Emergency Medicine

Beth Reser of Mansfield Summit High School commented, "both talks were very interesting, but I think the real value was the expertise of the presenters - in that after years of studying some of this information, the way it was put together and information emphasized made a lot of sense and gave me a greater understanding."

Basic Science Symposium: Radiology: The Inside Scope - Apr. 5, 2003

Medical Diagnostic Imaging Technology by Gary Arbiq, PhD, Instructor Radiology

Imaging the Heart: Clinical and Research Applications by Ron Peshock, MD, Professor Radiology

Human Brain Mapping during Exercise by Jon Williamson, PhD, Associate Professor Physical Therapy

Medical Imaging: Career Choice of the Future by Toby Edwards, Radiology Operations Manager at Zale Lipshy University Hospital

"Overall, each presentation was informative. I learned a great deal about myself and the things that I often take for granted as normal function. This newly acquired knowledge will help make some of the topics discussed in my class more relevant to my students," said Sharmelia Gunter from WW Samuell High School.

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Summer 2003 Yearbook

"Learning is not attained by chance, it must be sought for with ardor and attended to with diligence."

-Abigail Adams (1744 - 1818), 1780

This summer, a group of 7 teachers and 6 students embarked on a summer of opportunities and embraced the challenge of working with world-class researchers at UT Southwestern Medical Center to learn about and gain perspective on how science is done "in the real world." The 8-week program consisted of activities, presentations, and an individualized research project that contributed to the advancement of science. These experiences supplied them with a newfound confidence in their abilities to rise to the challenge and a rejuvenation of their love of science.

The program is open to all secondary Texas teachers, Dallas/Tarrant County Community College District teachers, Dallas Independent School District juniors, and Dallas/Tarrant County Community College District students. Applications for the 2004 Summer Research Program will be available in January and will be due on February 6, 2004, at 4pm.

Charlene Cole of Tarrant County College.

Host: Helmut Kramer, PhD, Center for Basic Neuroscience.



Charlene Cole

"The STARS Program at UT-Southwestern Medical Center is an exemplary program that serves as a conduit for professional and personal growth. Participant's academic knowledge is expanded through seminars, lectures, and hands-on experiences through research. Working as a member of a team promotes personal growth. You learn the importance of an individual's role in the overall success of a project. An accolade to Dr. Helmut Kramer and his lab members for an outstanding job of providing a knowledgeable and an exciting research experience. Dr. Kramer is an excellent mentor. This

has been an exhilarating eight-week experience. I will implement some of the protocols I used this summer in my fall semester classes."

Kara Durham of Staley Middle School, Frisco.

Host: Robert Rawson, PhD, Molecular Genetics.



Kara Durham

"Thank you to the STARS program for giving me the opportunity to work in Dr. Rawson's lab. I have come to know a great deal about *Drosophila melanogaster* (fruit flies) through the P element and SCAP excision screen we are conducting. My work this summer has provided me with the skills, knowledge, and patience necessary when working with fruit flies. I can't wait to share this with my students when we conduct genetic crosses with *Drosophila*. I am so grateful to Dr. Rawson and the people in his lab who have made me feel welcome and have patiently guided me along the way. I will miss them when I leave."

Lara Isbell of McMath Middle School, Denton.

Host: Dorothy Mundy, PhD, Cell Biology.

"Through the STARS summer research program I am working on a project to try and determine the function of a recently identified protein



Lara Isbell

known as p62. To do this, we will utilize a Yeast Two-Hybrid System to determine what known proteins interact with p62. I have primarily been working on building the constructs, or preparing the bait for use in this system. To prepare the bait I have been preparing PCRs of the luminal and cytosolic (tail) domains of p62 and have digested these inserts to be ligated with a vector and then transformed into bacteria. Being part of the STARS summer research program has been an incredible experience for me. This experience has opened my eyes to the world of research science and to what career

opportunities are available in that field. It has also helped me gain insight into how research is conducted. This knowledge will help me to better teach my students the nature of science and how to develop scientific ways of thinking. I can't wait to share my experiences and all that I've learned this summer with my students next fall and for years to come. This experience has been very rewarding for me personally as well. I have learned an incredible amount of information in just a short period of time and have gained self-confidence in my ability to accomplish new goals. The STARS program has given me an incredible opportunity to improve myself both professionally and personally."

Johnny McKenzie of Forest Oak Middle School, Fort Worth.

Host: Joseph Garcia, PhD, MD, Internal Medicine - Cardiology.



Johnny McKenzie

"It doesn't always work the first time but try and try until it does. That is the advice I would give future STARS participants. This summer program has been amazing. I truly enjoyed meeting new people and attending the lectures here at UTSW. The research at this university is changing the world, and the new scientific discoveries are changing science and our lives forever.

This experience has not been easy for me. It was difficult to understand what actually was happening in my research lab and most of the lectures. I asked a lot of questions and took a

lot of notes. I also did a lot of research, reading journals and searching the Internet. Everyone was patient and they worked with me and I appreciate that.

I worked specifically with a mitochondrial respiration test to compare oxygen consumption from the mitochondria of wild type and knock out mice. As a 7th grade science teacher I am very glad to have been apart of this program. I have really learned how to "trouble-shoot". Overall I've grown professionally and accomplished what I wanted to accomplish, which is furthering my own knowledge of science, the scientific process, and to improve on teaching my students. Thank you Dr. Garcia for allowing me to be apart of your team."

JD Stumpf of Byrd Middle School, Duncanville.

Host: Linda Baker, MD, Urology.

"The STARS program challenged me on so many levels. For the first few weeks I had to become a student again to learn what was necessary for even the most basic tasks. Then my task was learning to use new equipment, understanding its functions, and visualizing the goals and scope of my project. As I learned more, my mind lit up with questions, seeking to bridge the gaps in my knowledge.

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JD Stumpf

science fan. I am truly grateful for this opportunity, and wish to thank Dr. Baker, Shaohua Zhang, and the many other doctors, researchers, and medical students who helped me along the way."

Kim Wright of The Winston School.

Hosts: James Chao, MD, PhD, & Spencer Brown, Ph.D., Plastic Surgery.



Kim Wright

A key part of this experience was that things did not always go as planned. For me, practicing the scientific method was always that – practice. Now I had to be a hardcore troubleshooter. When I did solve a problem, or find a way around it, I suddenly wondered, "When did I learn how to do that? How did I learn to be a scientist?" I have begun to use this question as a guide in planning future lessons in my classroom.

I am only just beginning to see how this experience has changed my views as a teacher, citizen, and

"The most beneficial professional development program for biology teachers is the STARS program. Every STARS sponsored symposium, seminar, and in-service Saturday has provided me the pieces of a great, living mosaic. The Summer Research Program has brought this mosaic into a clear and sharp image titled Modern Biology. The biology of today has ushered in many new and exciting horizons, and I believe history will truly remember our day and time as the Age of Biology. I will remain forever grateful to the STARS program for providing me a ringside seat to the greatest show on Earth, life."

Ricardo Belmares of Hillsboro High School, Hillsboro.

Host: Mischa Machius, PhD, Biochemistry.



Ricardo Belmares

"I highly recommend this STARS program to any science teacher. The exposure to real-world science is the greatest asset of the program. No textbook can replace the experience of being in the lab setting: learning techniques and skills, making mistakes, and ultimately learning what real science in action is like. Even if the focus of the research is not directly part of your curriculum the experience will benefit how you approach your lab in the classroom.

My project was purification of the bacterial protein UVr A, which is involved in DNA repair. It takes a great deal of planning effort, and skill to trouble-shoot the purification protocol. These same critical thinking skills developed in the lab can be taught to the student in lab exercises. Good practices that relate to many of the science TEKS are addressed by the lab experience afforded by the STARS program."

Read All About It! Summer Research Program Teacher Gets Published

Kristi Morrison recently became a published scientist as a result of her research at UT Southwestern, which examined the relationship between asthma and depression in inner-city schoolchildren. Her host and coauthor was E. Sherwood Brown, Ph.D., M.D., an assistant professor in the Department of Psychiatry.

Kristi is a sixth-grade science teacher at Colleyville Middle School who participated in the summer research program in previous years. She restructured her science curriculum after gaining the real-world experience and said that the professional development opportunity is unparalleled. "The STARS Summer Research Program really gave me a boost in my enthusiasm as far as feeling I was part of something scientific," she said. "It caused me to rethink, 'What kind of skills do students need to become productive members of the scientific community?' When you teach five classes of the same thing every day, you've got to find ways to make it more interesting."

Read Kristi's article online at <http://www.psychiatrist.com/pcc/pccpdf/index.htm>.

Kristine M Morrison, MA; Arezou Goli, MD; John Van Wagoner, MD; E. Sherwood Brown, PhD, MD; and David A Khan, MD (2002). "Depressive Symptoms in Inner-City Children with Asthma." Primary Care Companion Journal of Clinical Psychiatry 4(5): 174-177.

Participants, Schools, Hosts

Joseph Arizpe

Townview - Talented & Gifted Magnet, Stephen Gold, PhD

Marlo Burks

Townview - Education & Social Services Magnet, James Bibb, PhD

Emily Hall

Townview - Talented & Gifted Magnet, Michael Bennett, MD

Joanna Jimenez

Molina High School, Preet Chaudhary, MD, PhD

Richelle Thomas

Townview - Science & Engineering Magnet, Diana Tomchick, PhD

David Graves

Tarrant County College, Beverly Rothermel, PhD

For more information about our teachers and students, including their research projects, please visit our website.



2003 Summer Research Program for Students Participants

Spring 2003 STARS Events *continued from page 2*

Special Symposium: 50 Years of DNA for the Whole Family (Parents & Middle School Students) - April 24, 2003

While parents were presented with information about the future of science and science education, students learned how to create DNA models and extract DNA from strawberries. The presentations were given by Gail Tomlinson, MD, PhD, Associate Professor Pediatrics UTSWMC; Lehman Marks, PhD, The Winston School; George Ordway, PhD, Professor Physiology & STARS Coordinator UTSWMC; Nicole Small, Chief Executive Officer Dallas Museum of Natural History. The student session was facilitated by Melinda Ludwig, Texas A&M Commerce and Angela Burcham, Science Educator Dallas Museum of Natural History.



Students stringing together a DNA double helix.

Special Symposium: 50 Years of DNA for the Whole Family (Teachers & High School Students) - April 26, 2003

After Watson & Crick: Some Key Developments in Biology by George Ordway, PhD, Professor Physiology & STARS Coordinator

Your Genome and What It Means to You by Skip Garner, PhD, Professor Biochemistry & Internal Medicine

"Absolutely marvelous - this program maps various resources into an accessible format - it makes sense," commented a teacher in attendance of the program.

Ann Marie McDonnell of Richardson West Junior High School said, "Excellent information - not just science, but economics and politics of the issues associated with continued research on DNA."

Special Symposium: Hot Topics in Hormones and Health for Female Physicians and Scientists - May 9, 2003

Use of Hormonal Therapies in the Pre- and Postmenopausal Women by Dr. Karen Bradshaw, Professor Obstetrics & Gynecology, UTSWMC

Cardiovascular Diseases in Women: Role of Diet, Exercise and Hormones by Dr. Nina Radford, Cooper Clinic, Dallas, TX

The Pros and Cons of Delaying Childbirth for the Professional Woman by Dr. Kathy Doody, Center for Assisted Reproduction, Colleyville, TX

Mood Disorders in Women: Their Causes and Treatments by Dr. Kimberly Yonkers, Associate Professor of Psychiatry, Yale University School of Medicine

Handling the Stresses of Life as an Academic Physician and Scientist by Dr. Barbara Waller, Dallas TX

This Health Symposium held by the Women in Science and Medicine Advisory Committee (WISMAC) featured topics on women's health issues. STARS thanks WISMAC for opening this program to our teachers.

Mark Your Calendars! Fall 2003

September 8, 2003 Monday 5:30 pm - 8:00 pm
Mini-Symposium: Muscles: Development & Wasting
Richardson Lecture Hall, D1.502

October 4, 2003 Saturday 9:00 am - 3:00 pm
Basic Science Symposium: Gastroenterology
Richardson Lecture Hall, D1.502

November 17, 2003 Monday 5:30 pm - 8:00 pm
Mini-Symposium: Exercise Training & Detraining:
3 Weeks of Bedrest Equals 30 Years of Aging
Richardson Lecture Hall, D1.502

December 6, 2003 Saturday 9:00 am - 3:00 pm
Teacher Inservice: Protein Crystal Growth (Repeat)
Meeting Room, D1.200

Other Important Dates to Remember

January 23, 2004 Friday
Deadline to submit requests for Science Fair Judges

February 6, 2004 Friday 4pm
Application Deadline for the Summer Research Program

June 7, 2004 Monday
Summer Research Program Begins

July 30, 2004 Friday
Summer Research Program Ends

All events are held on the UT Southwestern South Campus. For directions, call the STARS office or visit the STARS web page.

More Dates to Remember:

The Dallas Museum of Natural History's Nature & Science Lecture Series Schedule for Fall 2003

September 9, 2003 Tuesday
The Sacred Balance by Dr. David Suzuki

October 9, 2003 Thursday
Clues from the Deepest Sea by David G. Gallo and William N. Lange

October 13, 2003 Monday
Wade Davis, Explorer-in-Residence at the National Geographic Society

October 22, 2003 Wednesday
The New Science: Imagining the Unimaginable by Dr. Rita R. Colwell, Director of the National Science Foundation

Please check www.dallasdino.org for times, locations, and ticket price.

For additional information and reservations contact Heather Franklin. 214-421-3466 ext. 200 or hfranklin@dmnhnet.org

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of Texas.

Visit our new web site at
<http://www.utsouthwestern.edu/utsw/home/stars/index.html>

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PROGRAMS

SYMPOSIA

Basic Science Symposia
Mini-Symposia

OUTREACH

Bureau of Science Fair Judges
Distance Learning Initiative
Research Assistance
Science Ambassadors
Student Mentoring

SUMMER RESEARCH

Summer Research Program for Teachers
Summer Research Program for Students

TOURS

UT Southwestern Allied Health Sciences School
UT Southwestern Medical Center
Parkland Health and Hospital System of Dallas
Children's Medical Center of Dallas

INSERVICE SESSIONS

Cell-ibration
Biomechanics
Kidney Under Pressure
Genetics
Biotechnology
Exercise Physiology
Gel Electrophoresis
Human Physiology in Space
Muscle Physiology
Suturing Techniques

STARS Website is Moving:

UT Southwestern Medical Center is
overhauling their website, which should be
up and running soon.

STARS will have a new web address and
whole new look. Check it out at
<http://www.utsouthwestern.edu/utsw/home/stars/index.html>.

In the mean time, our current website
(<http://www.utsouthwestern.edu/stars>) will
be updated for the next few months because
the new one is still "under construction."

Summer Stock 2003 Available

A compilation of the classroom activities
developed by the participants in the 2003
STARS Summer Research Program for Teachers
is now available free of charge. The activities
range in level of applicability from middle
school science to Advanced Placement
biology. You may download these and other
activities from the STARS homepage. If you
are unable to download a copy, you may
obtain a FREE copy of Summer Stock 2003 by
contacting the STARS office at 214-648-9505
or 1-800-81-STARs.

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