

STARS NOTES

SCIENCE TEACHER ACCESS TO RESOURCES AT SOUTHWESTERN

SOUTHWESTERN
THE UNIVERSITY OF TEXAS
SOUTHWESTERN MEDICAL CENTER
AT DALLAS

STARS Notes
September 2002
Volume VII, Number 2

Physiology at the Extremes Take your students on an adventure to ANTARCTICA

By: Mindy Baxter, Senior Writer
UT Southwestern Medical Center, Office of News and Publications

Dr. Shane Kanatous, who is leaving for a research expedition to Antarctica in late September, plans to take students from Bobby Pierce's AP Biology class at Whitney High School along with him – via the World Wide Web. But, you are invited to interact and participate in the online experience.

Kanatous, a postdoctoral research fellow in internal medicine at UT Southwestern Medical Center at Dallas, has made two previous Antarctic visits. He may be traveling halfway around the world, but he will stay in touch electronically with regular Web updates on his research and personal observations on what life is like in one of the world's coldest places. He's hoping his journey, research and the Web site will spark the interest of local children whom he has connected with in the Science Teacher Access to Resources at Southwestern (STARS) program.

STARS was developed in 1991 by a group of UT Southwestern faculty members as a way to improve the quality of education in Texas. With 20 different, active programs, STARS has served more than 20,000 students, 4,000 teachers and almost 1,000 schools in Texas.



Kanatous has studied seals and sea lions for several years. He is interested in the animals' capacity to withstand the harmful effects normally associated with oxygen deprivation and the control and regulation of myoglobin in their muscles, both of which allow them to dive underwater without breathing for up to two hours. Myoglobin control and regulation in humans plays a key role in protecting the heart from disease, and Kanatous and other researchers hope animals like the seal can provide some clues to preventing or treating heart disease.

His goal during the 10-week trip is to take biopsies of seals' muscles, analyze them for myoglobin and isolate their ribonucleic acids (RNA) and protein. Via a Web site located at <http://www.utsouthwestern.edu/stars>, Kanatous will answer selected questions from STARS students, post a weekly question to the students and explain his research through e-mails and electronic pictures sent from Antarctica.

"The wonderful thing is that the animal we want to study is right there in nature. Seals routinely exercise while holding their breath without side effects normally associated with low oxygen conditions," said Kanatous, who earned his doctorate in physiology from Texas A&M University. "We don't have to create a model to study how animals will adapt to low oxygen - the perfect model already exists."

His journey is funded by a grant from the National Science Foundation and begins Sept. 28. The grant pays for



Dr. Shane Kanatous, postdoctoral research fellow in internal medicine, hopes to connect with local schoolchildren via the Web while he's doing research in Antarctica this fall.

everything involved in his trip, from funding for his research study and scientific equipment in Antarctica to required parkas and his room and board in McMurdo station.

"There's a lab bench with everything I need waiting for me when I get there," he said. "I don't have to bring anything down there with me."

Kanatous will travel on commercial airlines through Los Angeles, Auckland, New Zealand, and finally Christchurch, New Zealand. He will then hop on an Air Force plane for the final leg, which ends at McMurdo station's ice runway.

Once in Antarctica, the UT Southwestern scientist will set up camp with several other researchers in a tented area several miles from McMurdo station. The camp is located on the sea ice and allows the researchers direct access to the seals. With no natural land predators, the

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Spring 2002 STARS Events

Mini-Symposium: Stem Cell Research - January 14, 2002

Dan Garry, MD, Assistant Professor of Internal Medicine - Cardiology, began the STARS Spring semester of events with a look at "Stem Cell Research - Basics & Applications," and Fred Grinnell, PhD, Professor of Cell Biology and Director of the Program in Ethics in Science and Medicine, followed up this look at the basics with a discussion on "Stem Cell Research - Ethical Considerations." Kristi Morrison from Colleyville Middle School commented, "Dr. Garry was very interesting, informative, and very well spoken. Dr. Grinnell had a great use of humor throughout the presentation and was an excellent speaker."

Special Symposium: Women In Science & Medicine - January 26, 2002



Judy Pena demonstrates how to put a prosthetic leg together as she shares about her experiences as a student in the UTSW Allied Health School Prosthetics & Orthotics Program.

This special symposium organized by the Women In Science & Medicine Advisory Committee (WISMAC) featured presentations from professionals in various areas of basic science research & medical practice as well as in different stages of their careers. The day ended with a panel discussion with all the presenters answering questions from the audience, which was made up of teachers and students. "What a wonderful program for our young female students who might be interested in the medical or scientific field. You chose a variety of speakers, and having both doctors and students talk was very beneficial," said Tricia Gent of Wylie Jr. High School. Another teacher commented, "I especially enjoyed the panel discussion because we had a chance to really get information from the participants about how they've handled getting to where they are now."

Teacher Inservice: Biomechanics - February 2, 2002



Loretta Loykasek and Apryl Hampton work together on building a lever for the biomechanics inservice.

This biomechanics unit created by the American Physiological Society had all of the participants working together on an inquiry-based project. After the teachers created and built levers based on previous knowledge, they did supplementary activities, which aided them in their final task of revisiting and revising their original lever creations. Tamara Penny from Moore Elementary stated, "I really enjoyed the hands on approach. It kept me engaged in the information."

Mini-Symposium: Botany & Herbal Medicine - February 4, 2002

This mini-symposium was organized by The Botanical Research Institute of Texas (BRIT) and held at The Dallas Museum of Natural History at Fair Park (DMNH). Roger Sanders, PhD began the evening with a look at the "Botanical Basis of Medicinal Plants," and Karen Foley followed with information on an "Herb Education Center."

Mini-Symposium: Nervous System - March 4, 2002

Mark Henkemeyer, PhD, Professor for The Center for Dev. Bio. & Kent Waldrep Center for Basic Research on Nerve Growth & Regeneration, opened the mini-symposium with a presentation on "Proteins that Wire the Brain & Spinal Cord." Lisa Jeter from Flower Mound High School thought that Dr. Henkemeyer was a "fantastic orator." Kevin Nelson, PhD, Assistant Professor of Biomedical Engineering at UT Arlington & UTSW, followed by speaking about "Tissue Engineering for Nervous System Regeneration." Margaret Gregory from Colleyville Middle School said, "Dr. Nelson is a terrific teacher. He taught in my language. I can use this in the classroom."

Basic Science Symposium: Endocrinology - April 6, 2002

Our final event for the spring was a basic science symposium on endocrinology. Cai Li, PhD, Assistant Professor of Physiology, started the day with a general presentation on "Endocrine Glands & the General Principles of Hormone Action." George Attia, MD, Assistant Professor of Obstetrics & Gynecology, concluded the morning talks with an "Infertility Update." "Anabolic Steroids & Precursors as Performance Enhancing Drugs: Myth, Science, & Reality," was the first presentation of the afternoon session given by Richard Auchus, MD, PhD, Assistant Professor of Internal Medicine - Division of Endocrinology & Metabolism. Robert Dobbins, MD, PhD, Assistant Professor of Internal Medicine - Division of Endocrinology & Metabolism, gave the final talk of the day titled, "Type II Diabetes: New Hope for Prevention." Israel Solon from Greenhill stated, "this was one of the best symposia. All speakers were exciting, relevant, and provided information that will make me a better teacher."

Summer 2002 Yearbook

"Education is not the filling of a pail, but the lighting of a fire."

- William Butler Yeats

This summer 10 teachers and 10 students were chosen to embark on a new experience that offered them the opportunity to learn about and participate in the process and culture of science. Each of the participants came into the experience with differing backgrounds and preconceived notions about how science is done "in the real world." Regardless of how they came into the program, the successful completion and presentation of their research projects and the exposure to all the activities and presentations that UT Southwestern Medical Center offers gave them 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 Independent School District juniors, and Dallas County Community College District students. Applications for the Summer Research Program 2003 will be available in January and will be due on February 7, 2003, at 4pm.

Check out what the teachers had to say about their time here in their own words...

Jennifer Bernabo of Plano East Senior High School, Plano.



Host: James Chao, MD, PhD, Plastic Surgery.
"STARS has given me an opportunity to do research that I would have never been able to do. In my wildest dreams, would I believe that I would be working at UT Southwestern? During this summer, I have been working in Dr. James J. Chao and Dr. Spencer Brown labs' investigating how fat tissue can differentiate into bone cells. This opportunity has allowed me to see the science behind an operating room

to a research lab. I have realized that science is not facts, methods, or terminology but instead a living process. This complicated process is a rough road that leads to many undesirable results. The amazement is that the undesirable results contain the keys to total understanding of your own life as well as the keys to teaching my students the art of science. Thank you STARS for giving me the gift of seeing science beyond my imagination."

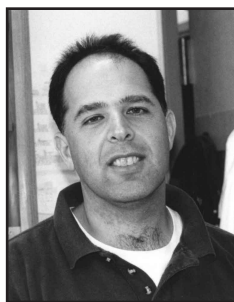
Lance Dewey of Trinity High School, Hurst-Euless-Bedford.



Host: Skip Garner, PhD, McDermott Center; Biochemistry/Internal Medicine.
"The most important things that I have learned from my research experience have not come in the form of the actual experiments that I ran. When is the next time I am going to be irradiating mouse skin cells? It's the process that hits me right in the face. The process of fitting a square peg in a round hole all the time. The process of answering one question only to be asked

five more. I loved my experience here because it has humbled me and beat me into submission. Everything that seems simple about my project ends up having its own intricacies and gremlins. My favorite thing about this summer is that I have been running around all over campus to different labs doing different things. I think this may be a somewhat unique opportunity compared to other teachers in the program. I also get the chance to practice biology (in a tissue culture lab), chemistry (measurement of chemicals) and physics (dealing with the optics in the Variable Spectrum Synthesizer). All this at the same time that I am working on one of the first or second generations of this machine that shows promise in the future!"

Graham Gadd of Ford Middle School, Allen.



Host: Jonathan Cohen, PhD, Internal Medicine.
"The STARS program and my experience at UT Southwestern has been one of the most rewarding experiences that I have encountered as a science teacher. I started the summer working on a gene mutation that is responsible for transportation of long chain fatty acids. Although my research has been like a rollercoaster and the feeling of failure has been my best friend, my work here has really exposed me to the world of research. I am so grateful to all those involved for making this experience so much fun and educational at the same time."

Jerry Grizzle of Plano West Senior High School, Plano.



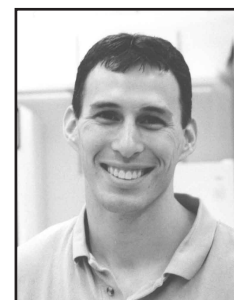
Host: Jeffrey Elliott, MD, Neurology
"Words cannot express my gratitude to the STARS program for this summer's experience. I have had the opportunity to work in the ALS research laboratory of Jeffrey Elliott, M.D. Thanks to Dr. Elliott and Uma Krishnan Ph.D., I have learned more in eight weeks than four years of college coursework. The research has been centered on evaluating the SOD1 protein and mutations known to cause FALS (genetic Lou Gehrig's disease). The laboratory's work is vitally important in understanding the unknown toxic functions of the SOD1 mutations. Hopefully, a break through will come through the cell and transgenic mice studies that will allow a treatment or at the outside chance a cure for this terrible disease. The STARS experience has been exhilarating. Over the past seven years of teaching, I feel that I have lost touch with the world of science and have been caught up in just surviving in the classroom. Teachers often get bogged down in the daily routine of education; however, this experience has reinvigorated my interest in science education and has initiated many great ideas for my classroom and students of the future. I have no doubt that I will be able to impress upon my students the need to understand the scientific method of problem solving. Who knows, maybe one of my future students will be able to complete the work started by the Elliott lab personnel and myself."

Mi Hwang of Creekview High School, Carrollton-Farmers Branch



Host: David Mangelsdorf, PhD, Pharmacology/HHMI.
"The research opportunity that is available here at UTSW is amazing. It is one that every science teacher should take advantage of. The scientists are dedicated and are eager to share their knowledge. The chance to experience a learning environment where the process is just as important as the result is refreshing and inspiring. I leave here with more respect for the scientific process and a deeper love of the field."

Jason Mayberry of Carroll Middle School, Carroll.



Host: James Bibb, PhD, Psychiatry.
"What a privilege it has been to be a part of the STARS summer research program. In the time since graduating college and beginning my teaching career I have come to feel disconnected from "real world" science. Participating in the biomedical research here at UT Southwestern has shown me that the information I have studied and teach my students truly does have real world applications. If only the kids could see how the concepts they learn in school (yes, even in middle school) are being put to practical use in today's cutting edge scientific laboratories. Thanks to the STARS program I now have the insight to hopefully share this vision with my students."

Jamie McNeill of Azle High School, Azle.



Host: Howard Gershenfeld, MD, PhD. Psychiatry & Integrative Biology
 “Working in the Department of Psychiatry has been an awakening for me. Prior to my STARS experience, I had no idea there was even an area of study called molecular psychiatry! I am in awe at the work being done in Dr. Gershenfeld’s lab and feel so privileged to have been given the opportunity to be associated such a distinguished scientist. The experiment I am involved with is searching for patterns of gene expression in the brain, specifically the hippocampus

and the amygdala. The gene expression we are looking for is multifactorial or multigenic, that is, not due to a single major gene. We are using mice and rat models and focusing on the genes that cause anxiety disorders, such as generalized anxiety disorder (GAD), posttraumatic stress disorder, phobias, panic disorder, and obsessive-compulsive disorder (OCD.) I will many positive things back to my classroom, but I think the most significant is a renewed sense of wonder at the potential of scientific endeavors. I am grateful to Dr. Shumin Zhang, Dr. Gershenfeld, and STARS for this incredible adventure.”

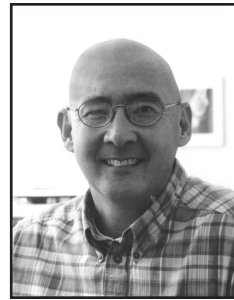
Kristi Morrison of Colleyville Middle School, Grapevine-Colleyville.



Host: Linda Baker, MD, Urology.
 “The STARS summer research program is an outstanding program that offers science teachers a valuable learning experience at UT Southwestern Medical Center. I am very fortunate to have been selected to participate in the STARS program for a second summer and am excited to be able to share my continued adventure in laboratory research with my colleagues and students. This year I have had the incredible opportunity to work in a research lab in the Pediatric Urology department under Dr. Linda

Baker. While working in the lab, I have learned a variety of new lab techniques, used cutting edge technology and equipment, and had the benefit of being a part of a very dedicated and hard working lab group. My research project this summer focused on examining the relationship between ephrin-B2 and a genetic birth defect, hypospadias in humans. My experiences in the lab have really given me a greater depth of understanding about the skills that a scientist must have in order to work in today’s research lab setting. My hope is to be able to share my experiences from being a part of the STARS program with my students and help better prepare them for their future. I am truly grateful for the opportunity given to me by the generosity of the STARS program, UT Southwestern, Dr. Baker and her lab group. I will treasure and share my experiences in and out of the classroom for many years to come.”

Greg Park of New Diana High School, Diana.



Host: Robert Illaria, MD, Internal Medicine - Heme/MC
 “The Summer Research Program for Teachers has provided for me, an opportunity to expand my knowledge and understanding of Molecular Biology and be able to apply that knowledge as a classroom teacher. The techniques and procedures that I learned in the Ilaria lab brought me up to date with the most current

research procedures. However the most important aspect of the summer program for me is the opportunity to actually contribute data to an ongoing research project (Mine is Ewing’s Sarcoma). The successes and failures of each day brought me a new realization of the frailty of high level research. Thanks to all the members of the Ilaria Lab and UTSouthwestern for giving me the chance to participate in this program.”

Sharla Riddle of Stripling Middle School, Fort Worth.



Host: Andrew Zinn, MD, PhD., McDermott
 “Center for Growth & Development. The impact that the STARS summer research program will have on my students is tremendous. Science has changed so dramatically since I first began teaching 19 years ago. I believe that the STARS program has helped me make the leap into the 21st century of science. Extreme thanks are extended

to the STARS program, Dr. Andrew Zinn, and Ling Zhang for their encouragement and expertise. Through my research on Turner’s Syndrome, I’ve been able to see how science truly benefits people. Not only will I teach my students new methods and procedures, I will also bring humanity into science. Southwestern Medical School and Dr. Zinn have shown me that science is about people and ways to make their lives happier and healthier.”

For more information about our teachers and students, including their research projects, please visit our website at www.utsouthwestern.edu/stars/programs/srp.html.

Summer Research Program for Students



Participants	Schools	Hosts
Yolanda Arteaga	Townview - Science & Engineering	Maureen Finnegan, MD
Leslie Cabrera	Kimball High School	Preet Chaudhary, MD, PhD
Connie Chambliss	Carter High School	Jer-Tsong Hsieh, PhD
Cynthia Eguavo	Townview - Talented & Gifted	Ravi Sarode, MD
Pauline Hemphill	Lincoln High School	Roseanne Armitage, PhD
John Nguyen	Northlake Community College	Paul White, MD, PhD
Thien Nguyen	Skyline High School	Jiping Zha, MD, PhD
Maria Ruiz	Seagoville High School	Zerrin Yetkin, MD
Kelly Rula	Townview - Talented & Gifted	Nancy Monson, PhD
Michael Sargent	Booker T Washington High School	Sherwood Brown, MD

Fall Calendar of Events

All STARS events are offered free of charge to Texas teachers.

September 9, 2002 Monday 5:30 - 8:00 pm
Mini-Symposium: Physiology at the Extremes
Richardson Lecture Hall, D1.502

October 5, 2002 Saturday 9:00 am - 3:00 pm
Basic Science Symposium: Surgery
Richardson Lecture Hall, D1.502

November 4, 2002 Monday 5:30-8:00 pm
Mini-Symposium: Epidemiology
Richardson Lecture Hall, D1.502

December 7, 2002 Saturday 9:00 am - 3:00 pm
Teacher Inservice: Muscle Physiology
Meeting Room, D1.200

Other Important Dates to Remember

January 24, 2003 Friday
Deadline to submit requests for Science Fair Judges

February 7, 2003 @ 4pm Friday
Application Deadline for the Summer Research Program

June 16, 2003 Monday
Summer Research Program Begins

August 8, 2003 Monday
Summer Research Program Ends

All events are held on the UT Southwestern South Campus except otherwise noted. For directions, call the STARS office or visit the STARS web page at www.utsouthwestern.edu/stars/welcome.html.

Physiology at the Extremes – continued from page 1

seals are docile. The team Kanatous will be working with plans to study animals from newborns to full-sized adults, which can weigh as much as 1,000 pounds.

The challenge for outreach to students, Kanatous said, is not in simplifying the science enough for them to understand – it's keeping details of the research interesting enough to captivate the students.

"Kids are so advanced now," he said. "They ask hard and detailed questions, and they don't want things overly simplified."

He will arrive at the start of spring in Antarctica, which means winds can be as high as 90 mph and temperatures are about minus 30 degrees, or about 60 degrees below freezing.

"By December, the temperature begins to approach freezing (32 degrees), and by then that feels so warm we're working outside in T-shirts," he said.

The environment's rigors do take their toll. Researchers must eat much more than usual to make up for additional calories spent trying to stay warm, and Kanatous expects to lose as much as 20 pounds on the trip. The group prepares its own food, and camp electricity comes from a generator. From October to December, Antarctica experiences constant daylight.

Kanatous said he hopes that the glimpse of his research and life in Antarctica through the Web site will start more children on the path to scientific careers.

Please visit the Physiology at the Extremes website at <http://www.utsouthwestern.edu/stars> to see weekly updates, submit questions, answer Shane's challenge question of the week, and much more.

STARS / Dallas ISD Summer Workshop for Biology Teachers

This two-week program is designed to give teachers an opportunity to practice and learn various techniques, laboratory activities, and units that can easily be implemented into the classroom. In order to facilitate the implementation of these labs and activities, each teacher was given an allotted amount to funds to order supplies for their classes. They were also exposed to the numerous opportunities and resources available through STARS, UT Southwestern, and Dallas ISD. The participants were required to present a modified or original lesson at the end of the workshop. When asked to comment about how they would describe their experience, this is an excerpt of what a few of them had to say...



"I found the workshop to be very beneficial. It provided me with a lot of confidence. I like the hands-on aspect taken in presenting the workshop."

"Do it! STARS has a very relaxed atmosphere that is conducive to learning."

"The activities taught were of practical use in the classroom. I now have many more tools for teaching."

Participants:

Kenya Curry,
WW Samuell High School

Shajohnia Miles,
Sunset High School

Darlene Ford,
Carter High School

Anthony Strawn,
WW Samuell High School

Kurt Graber,
Manns CLC

Carlotta Williams,
H Grady Spruce High School

Niteka Harwell,
Lincoln High School

Chian Wright,
Carter High School

Amy Kline,
Health Special High School

Mark Yoder,
North Dallas High School

STAFF

George Ordway, Ph.D
STARS Coordinator
Jan and Bob Bullock Distinguished
Chair for Science Education
george.ordway@utsouthwestern.edu

Jeannie Han
Education Coordinator
jeannie.han@utsouthwestern.edu

Pat Bleigh
Administrative Assistant
patricia.bleigh@utsouthwestern.edu

5323 Harry Hines Blvd.
Dallas, Texas 75390-9137
(214) 648-9505
(800) 81-STARS
FAX: (214) 648-9508
Homepage:
www.utsouthwestern.edu/stars

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Core funding for the STARS
program is provided by the state
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5323 Harry Hines Blvd.
Dallas, TX 75390-9137

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

Summer Stock 2002 Available

A compilation of the classroom
activities developed by the
participants in the 2002 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 at
<http://www.utsouthwestern.edu/stars/resources/stock02/stock.html>.

If you are unable to download a copy,
you may obtain a **FREE** copy
of *Summer Stock 2002* by contacting
the STARS office at 214-648-9505
or 1-800-81-STARS.

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