

These STARS may be doctors or researchers



By Jo Seltzer, Special to the Beacon

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Lots of young people are into social networking these days. But another kind of networking has been going on for two decades in laboratories across the St. Louis area.

Each summer dozens of students participate in STARS (Students and Teachers as Research Scientists), a program sponsored by the University of Missouri St. Louis. This year, more than 60 students spent their summer doing original research in top labs of academia and industry.

"These kids are the scientists and engineers of tomorrow," declared Michael Anch of the Saint Louis University department of psychology.

Each of them also wrote a formal research paper and gave a presentation to the other students and faculty before graduating. The STARS program also included lectures on topics from research ethics to nanotechnology and scientific contests. Social events such as excursions to the symphony and a Cardinals game gave these like-minded students a chance to know each other.

How does such a summer affect a young person's ambitions? Does doing the daily lab work change his or her conception of science? Is six weeks enough for a meaningful experience in complicated fields?

Four STARS students agreed to be interviewed at the beginning, middle and end of the program. They came from different schools and backgrounds, and worked in very different areas, but all had a love of science and were enthusiastic about the possibility of making it their life's work.

ANOTHER KIND OF FACE BOOK

When asked what prompted his interest in science, Jesse Drapekin cited his aptitude for math and science. "I would rather do an hour of math than sit down and read a love story."



PHOTOS BY JO SELTZER

Jesse Drapekin smiles in front of his final Power Point presentation.

He knew he would probably enjoy the summer because his older brother, Paul, a student at Emory University had participated in the same lab at Washington University Medical School and encouraged him to apply.

Jesse, a senior at Whitfield School, has always wanted to be a physician, most likely a surgeon. He began the STARS program thinking that the experience would help him understand the scientific method. He believes exposure to laboratory science is necessary for all medical doctors. However, he thought that research would not be part of his future. By the end of the program, he had changed his mind. He still intends to go into medicine, but also sees research fitting in.

His research with Dr. J. Gail Neely, professor of otolaryngology at Washington University medical school was successful enough that it will be published. He and another STARS student, Paul Lisker from Clayton High School, used a special computer program to analyze videos showing the faces of volunteers speaking two phrases. At first, they subjectively classified each subject as "deadpan," "somewhat animated" and "animated." Then the facial movement of each subject was analyzed. They found that those subjects they had classified as the most animated or expressive had much more movement in the upper half of the face than those classified as deadpan.

Jesse cited a number of other factors that made the summer exciting for him. He liked working in an office with a window and collaborating with another student. Dr. Neely gave the students extra experiences, such as shadowing him, going into an operating room and even dissecting a human head.

Neely has been mentoring STARS students for 16-17 years. He is passionate

about assisting people of any age who are striving for excellence. He says he loves to watch young bright minds think -- which they do very fast and very well. "What happens almost always is that they come up with fresh slants that are right on the money."

Neely's students are asked to form hypotheses and try to substantiate them. They learn what makes a fact a fact, and how to recognize it. "That's called research," he says.

NERVOUS SYSTEM RESEARCH

Avital Shulman, a senior at Block Yeshiva, wanted to see what it is like to work in a lab. Coming from a very small school, she was also interested in meeting a variety of other students who enjoy math and science.



Avital Schulman searched for proteins characteristic of a certain type of nervous system cell.

Her summer work, like Jesse's, confirmed the original hypothesis. Dr. Mariana Beltcheva at Saint Louis University's medical school works with mouse stem cells and the nervous system. Avital collected data that substantiated an observation that opioids like morphine increase the percentage of stem cells that become progenitors of oligodendrocytes. Oligodendrocytes are the cells that form the myelin sheath wrapped around the axons of nerve cells. (This type of cell is classified as glial.) After trauma, much loss of motion is due to oligodendrocyte injury.

Avital stained cell cultures of stem cells for two proteins characteristic of oligodendrocyte progenitors. She then measured the amounts of these proteins in treated and untreated cultures based on the intensity of fluorescence observed with a special microscope. More cells in the opioid-treated cultures developed fluorescence.

While she enjoyed the summer and had lots of interaction with her mentor and others in the lab, Avital decided that she would be more likely to go into medicine than pure scientific research. "I need people, not just computers,"

she said.

UNEXPECTED RESULTS

Olivia Newbury, a senior at the Metro Academic and Classical High School, explored two kinds of science that interested her this summer. During the day, her STARS project in Michael Anch's laboratory had her analyzing computer tracings showing patterns of activity in rat brains as they slept. In the evenings and on weekends, she participated in an education program at the St. Louis Zoo.



Olivia Newbury points to brain waves of a sleeping rat.

Olivia credits great teachers with getting her hooked on science. She loved the projects: making boats that float in fifth grade and designing a gear-driven toy car in seventh grade. And she was a big fan of "Bill Nye the Science Guy."

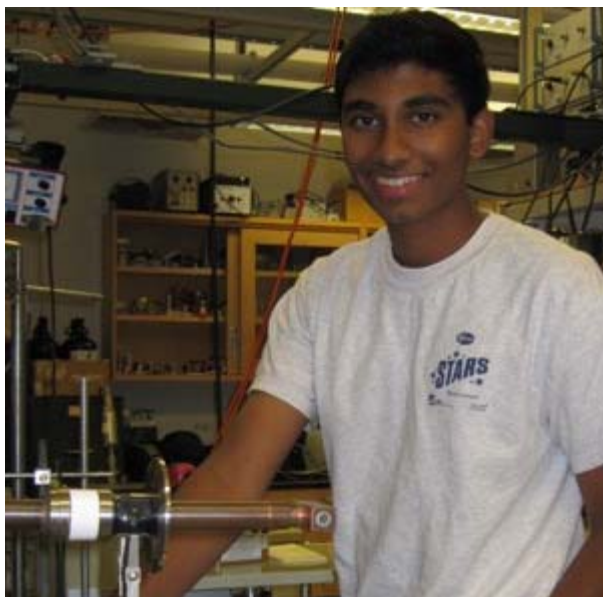
Results in Olivia's case did not confirm the hypothesis that a certain area of the brain controls one type of sleep. Rats with lesions in that area had the same sleep patterns as un-lesioned rats. "That was disappointing, but I understand that's how a lot of research goes," she said.

Still, she had "so much fun in the computer room" with her STARS partners, Bobby Song (Parkway West) and Zach Weinstock (Parkway North). The teamwork was very important to her; she, like Avital, discovered she liked working with people more than with data. She might be interested in going into psychology. And she really enjoyed learning about animals at the zoo.

WORKING ON THE FRONT LINE

Aashish Chalasani, a senior at MICDS, found himself working on the frontiers of basic physical chemistry at UMSL and loving it. The son of two physicians, he had spent the previous summer collecting data at the St. Louis VA Medical Center (Cochran) on breast cancer in schizophrenic patients. He

already knew that he enjoyed research.



Aashish Chalasani stands amid the "Intracavity Laser Spectroscopy" apparatus used to study the molecular structure of platinum compounds.

But Aash didn't realize when he began the summer that he would "be doing real experiments and producing real results. That is really cool. Normally kids our age wouldn't be able to work on the 'front lines'."

With his mentors Drs. James and Leah O'Brien, Aash and another STARS student, Stephen Ryan (Missouri Academy), bombarded two gas-phase diatomic platinum compounds with lasers and looked at the spectra of light waves absorbed. By analyzing these spectra (which look like a very long series of peaks and valleys) they can begin to calculate the bond length and energy between the two atoms in the molecule. Since platinum is used often as a catalyst, this work is the beginning stage of helping to design more effective catalysts. (A catalyst is a substance that increases the rate of a chemical reaction without itself undergoing any change.)

At the end, Aash "learned that I liked having a problem and taking a step forward in solving the problem by doing experiments. Our research was in the beginning stages, but I enjoyed playing a part, even though minuscule, in solving a big problem." He, like Jesse, may find his name on a publication.

A RIGOROUS PROGRAM

All four students spoke of their pride in writing the research paper and presenting their results. The STARS program structures the writing of the paper so that it is done over the course of the six weeks. Tony Kardis, senior program adviser, guides the writing and formatting process along with Terrence Brennan and Jennifer Freund, student advisers. The mentors

carefully supervise the content. Olivia reported that Dr. Anch had her revise her paper twice.

Kenneth Mares, director of the STARS program at UMSL, calls the students "the best and the brightest." He points out that workers with degrees in math, science and engineering are needed today more than ever for America to maintain its leadership. The STARS program gives these advanced students a chance to try out the life of a scientist. A list of recent graduates and their college majors shows that most do choose to pursue science in some form.

According to Mares, this is the only summer science program that includes real bench research. It began in 1988 as a national program, but leaders later decided to limit participants to the St. Louis area. As UMSL Chancellor Thomas George put it, "All of us are working toward one goal: providing the critical scientific workforce needed to move the St. Louis region forward."

The "all of us" includes the participating institutions, as well as corporate sponsors. This year, students worked in labs at UMSL, Washington University, Saint Louis University, the St. Louis College of Pharmacy, the Donald Danforth Plant Science Center and Solae.

Some of the mentors, like Anch and Neely, have been hosting students for many years. They find the six weeks rewarding to themselves as well as their charges. As Neely puts it, a six week program creates a daily deadline and causes his own productivity to increase. Anch says he likes the idea of making strong students even stronger.

Some scientists volunteer to have students in their laboratories because their own children have participated in the program. That is how students have come to do research at the College of Pharmacy and Solae.

This year's sponsors are Pfizer Inc., LMI Aerospace Inc./ D3 Technologies, St. Louis Symphony Orchestra, Solae, UMSL and Washington University.