A. Linwood Holton Governor's School

Spring 2008 Newsletter

www.hgs.k12.va.us

Virginia's First Virtual Governor's School

Danny Dixon
Director

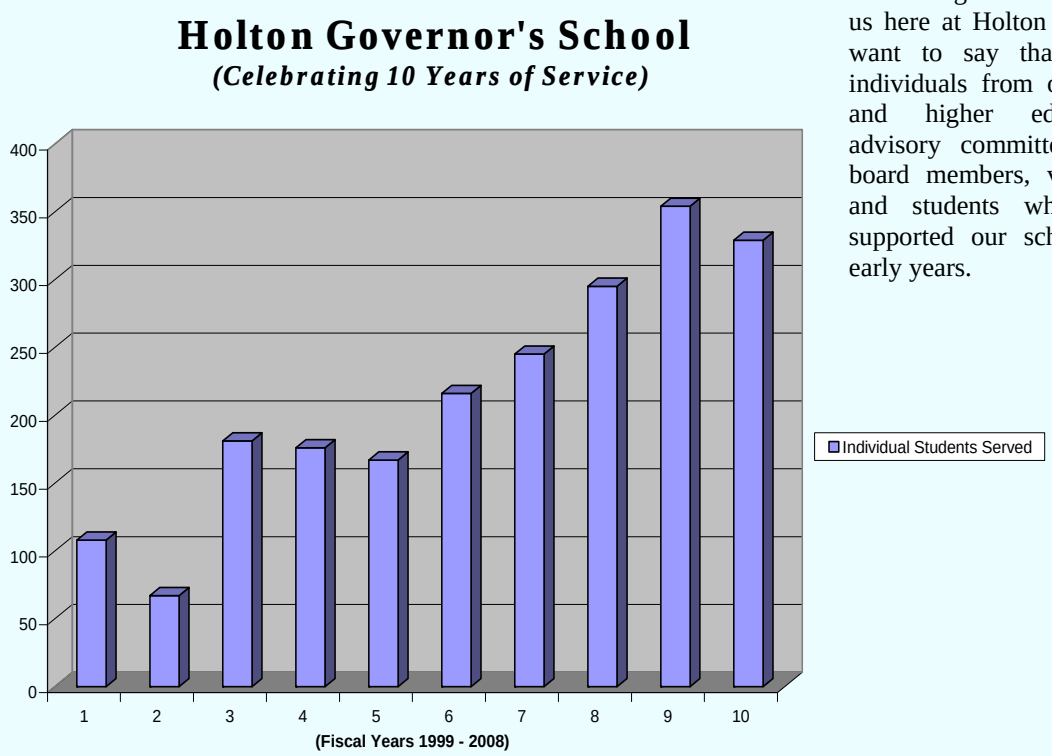
Director's News

Contents

Ten Years Upward

We are very proud to report that the 2007-2008 academic year marks the **10th Anniversary** of the creation of the A. Linwood Holton Governor's School. Since its inception in the fall of 1998, two thousand one hundred and thirty-eight students from our fifteen school system partners in Southwestern Virginia have been served by the Governor's School. Since that time, our graduates have moved on to continue their education and launch their careers in a wide variety of professions, literally all over the world. While we have lost contact with most, occasionally we will hear from a former student who just wants to reconnect with their instructors or to say thanks for the unique learning opportunities they had while a student here. It is certainly gratifying to all of us to have been given the opportunity to work with such an outstanding program and inspiring group of young people.

As we begin our next 10 years, all of us here at Holton Governor's School want to say thanks to the many individuals from our school systems and higher education partners, advisory committee, and governing board members, volunteers, parents, and students who have led and supported our school through these early years.



Students Observe At World's Largest Solar Telescope

Rachel and Zhanna, students from Wise County in Dr. Steve Rapp's Astronomy class at A. Linwood Holton Governor's School, presented a proposal this January to the National Optical Astronomy Observatory (NOAO) in Tucson, AZ. After a teleconference with two astronomers from NOAO on Feb. 7, the students were thrilled to find their proposal had been accepted! The title of their proposal was: *Freckles on the Sun—Determining the Magnetic Field Strength of Sunspots*. "We would like to use the McMath-Pierce telescope to determine the magnetic field strength of sunspots. We plan to use infrared Zeeman split lines to retrieve the necessary data. These measurements will then be compared with different sized sunspots, different latitudes, and active longitudes," said Zhanna and Rachel.

This opportunity resulted from Dr. Rapp's participation in the NOAO's Teachers as Leaders in Research Based Science Education Program. The students traveled in early March to the world's largest solar telescope, the McMath-Pierce Telescope, located at the Kitt Peak National Optical Observatory near Tucson. Three days were spent on the 7000-foot mountain observing sunspots using the Near-Infrared Magnetograph (NIM) that has an infrared camera array.

Dr. Rapp's students were in competition with about 250 students from across the United States for observing time on the giant telescope.

Locating a sunspot

The structure includes a tower nearly 100 feet in height from which a shaft slants two hundred feet to the ground. The shaft continues into the mountain for about another 200 feet, forming an underground tunnel where the sun is viewed at the prime focus.

A virtual tour of the facility can be found at http://www.noao.edu/outreach/kptour/mcmath.html.

Rachel and Zhanna log into Dr. Rapp's Astronomy Class from J.J. Kelly High School.

The A. Linwood Holton Governor's School is happy to make this exciting learning opportunity available to the students of our area, and very proud of Rachel and Zhanna's success in being accepted.

Innovative Approaches in Study of the Human Body

As in a traditional **Anatomy & Physiology** class students in this Virtual Class spend much time reading, memorizing, performing lab activities, and using critical thinking skills to understand the structure and function of the human body. However innovative approaches are often used to enhance the learning that occurs. One strategy employed involves analyzing actual case studies and hypothesizing medical treatments that could be incorporated in the care of the patient.

After in-depth studies of the systems involved, students were asked to consider the following:

"A baby is born without an interventricular septum. What would you, as a surgeon, suggest as a possible correction to this condition?"

An example of student collaboration concerning this defect follows:
It was agreed that this condition is chronic and affects the normal movement of blood throughout the heart. If the A-V bundle branches are absent, the heart cannot contract correctly. Several surgeries are needed to reconstruct the septum including cardiac catherization. This allows a device called a septal occulador to be inserted that provides a permanent seal which helps the heart correct its blood flow.

Other case studies that HGS students are working on include the following:

"Post polio symptoms have reappeared in a patient. Hypothesize medical care that would avoid further degeneration of motor neurons that may cause this condition to reoccur."

"As a physician today, how could you have prevented President George Washington's death which has been attributed to the trouble he experienced in swallowing and breathing?"

"Cystic Fibrosis is caused by airways that become clogged with thick, sticky mucus which attracts bacteria. Hypothesize a treatment that could eliminate the production of this viscous material."

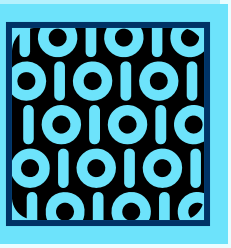
"What effect does cell phone use have on the body? Can this cause the growth of cancerous tumors in the brain?"

Case studies are an effective way to motivate students to analyze scientific information on a topic that interests them. Science becomes relevant as a result. In examining case studies students are challenged to use the information learned in class and put it to use in the real world. This also helps students to own the new material that is being studied.

In formulating their recommendations to a variety of case studies, HGS Anatomy & Physiology Students solidify their understanding of the material and creatively apply it to real-world problems faced by medical practitioners every day.

Are you planning a degree in engineering and computer programming?

Need a jump start and six hours of college credit?



Beginning in the fall 2008 semester, the Governor's School will offer a new course, ***Introduction to Engineering Methods and Computer Programming***, which will be the school's first computer programming course. The course will introduce students to higher level programming languages including Fortran, Java, and the various C dialects such as C itself, C++, and C#. However, the main purpose of the course is to teach the fundamentals of structured programming and the use of the object oriented language C++. Thus, students will use industry standard code development packages, such as Microsoft Visual Studio Professional, to write original C++ application programs.

However, as the name implies, the class will be much more than the usual programming class. Students will also develop problem solving strategies for technical problems. In additional to original code development, packaged software such as Matlab, for programming, and TecPlot 360, for data analysis, will be used to develop computer model based solutions to technical problems encountered in engineering as well as in other fields. Students of all backgrounds will be able to successfully traverse the assignment terrain since technical fundamentals required to solve course problems will also be covered as needed.

Dr. Norton, the instructor for the class who also manages the Governor's School computer resources, recently spoke about the class. "We are very excited about the opportunity the class presents for both the students and the Governor's School. It is very rare that high school students have an opportunity to explore industry standard programming languages much less get their hands dirty by tackling real technical problems. We plan to do both and to do it in an innovative and exciting manner. We will use everything: videos, documents, books, web sites, and much more to cover computer language fundamentals. This will put our students about a year ahead of their colleagues in college from day one."

"Also, for the first time at the Governor's School, this class will have office hours and what we refer to as lab hours. The lab will be a scheduled on-line meeting room where students can discuss among themselves programming problems and ideas. Students will be able to talk to one another in real time and sketch out their problems and/or ideas for others to see and discuss. There are also plans to test the ubiquitous web cam with the lab. The office hours will be a time outside of the normal class time for one-on-one student-teacher discussion, a time when students can talk to the instructor about any problems they are having. The instructor and student will be able to literally meet on the student's computer, such as their home computer, with the instructor looking at the student's computer screen just as if he were looking over the student's shoulder, talk to the student, not just text chat, offer suggestions, and even make changes to the student's work on their home machine, <u>all</u> in real time."

"We also have a few surprises we are working on as well. One may be that well qualified students would write control programs for robots and test their work with real hardware."

"With this hint of things to come for students and the associated technical challenges it presents the Governor's School, you can understand why we are very excited about this class."

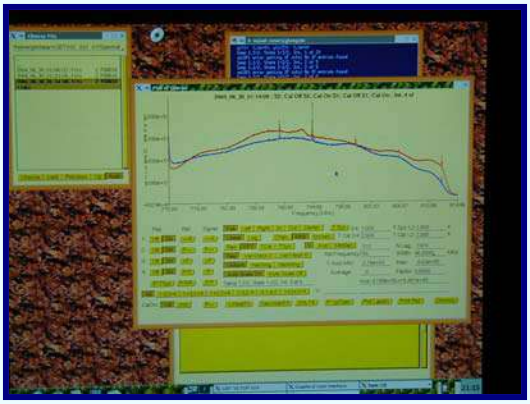
The course is an introductory class for the Software Engineering (a.k.a. computer science) program at UVA-Wise and Radford University as well as for programs at other Commonwealth schools.

The class will be offered in a full academic year schedule as well as in a block schedule. The academic year class will meet daily from 1:20 to 2:10 pm beginning this fall. The block schedule class, which will be offered in the spring 2009 semester, will meet from 10:00 to 11:30 am daily. Dual enrollment students will earn six college credit hours by completing the class.

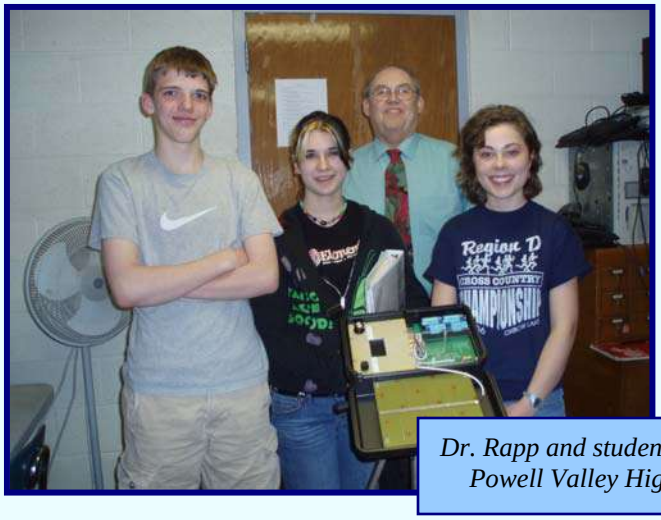
Dr. Bruce Norton is the instructor for the class. He has engineering degrees from both the University of South Florida and the Massachusetts Institute of Technology. He has many years experience developing software solutions ranging from technical database construction to the numerical analysis of the magnetoaerodynamic flow over a hypersonic re-entry vehicle.

Students Hunt for Alien Radiation

No, you don't have to worry about an extra-terrestrial alien invasion! A. Linwood Holton Governor's School astronomy and physics students are conducting a survey of radio frequency interference (RFI) in southwest Virginia. This pioneering investigation was conceived by Dr. Steve Rapp, science instructor at the school. With support from the National Aeronautics and Space Administration (NASA), the National Radio Astronomy Observatory (NRAO) at Green Bank, West Virginia, and the National Science Foundation, Dr. Rapp has received four RFI detectors for student use. During the summer while working at NRAO Dr. Rapp helped test a prototype of the RFI detector. After several iterations the detector is ready for data collection. About 50 students have been busy collecting data since the project started. Photo 1 shows students with the RFI detector. The participating students will share their data with the scientific community (available on the web now at http://steverapp.pageout.net/page.dyn/student/course/course_home?course_id=118047) and in a joint student-NRAO publication about the research analysis this spring or summer.



Radio Frequency Interference has become problematic in the collection of radio astronomy data, even at seemingly remote NRAO locations like Green Bank, West Virginia, site of the world's largest radio telescope of its kind (see photo 2). This was readily apparent one night at the Green Bank Telescope when data about pulsars was being collected. Unusual spikes in the data indicated alien RFI, radiation not of cosmic origin (see photo 3). This interfering radiation can include such mundane things as faulty water heater elements, electric fences, malfunctioning power transformers, cracked electric insulators, and tap boxes on cable television lines.



Dr. Rapp and students at Powell Valley High

Radio astronomers observe at many different frequencies, but four frequencies are of special interest: 800-900 MHz, the range in which pulsars radiate; 1420 MHz, the frequency at which neutral hydrogen emits and 1665 MHz where hydroxyl groups give off radio waves. Pulsars are neutron starts that emit beams of radiation (think of a lighthouse) that are extremely periodic. Some are so recurrent that perhaps someday they could be used as a universal timing mechanism. The study of neutral hydrogen is desirable as a tracer for water which has hydrogen in it. Astronomers figure where there is water there is life! Hydroxyl groups are interesting; they make up compounds like alcohols and formaldehyde, organic compounds.

The project is designed to address the National Science Education Standards, especially those dealing with designing and conducting a scientific investigation. Check out other standards addressed at this web site: http://steverapp.pageout.net/user/www/s/t/steverapp/Science%20Standards.htm.

"The students have developed a hypothesis: There is a relationship between the power of RFI signals and topographic elevation," says Dr. Rapp. "They are approaching this problem just the way a scientist would. Students are making this authentic real world learning their own at the A. Linwood Holton Governor's School."

History in the Making….

Students enrolled in ***Appalachian History*** at the ALHGS have increased significantly the number of projects archived on-line at www.hgs.k12.va.us. Fall 2007 student projects are in the process of being added to the archive and the spring 2008 projects look to be some of the most ambitious to date. With projects ranging from local Civil War battles to the history of the log cabin in Appalachia, students are leaving the traditional classroom setting to gain valuable experience in historical research. It is our goal to continue enhancing our on-line archive with an ever-increasing number of local history subjects, accessible to any individual interested in the history of Far Southwest Virginia. The scope of the student work being archived has been expanded to include Powerpoint presentations and/or formal research papers focusing on local history and transcripts of oral interviews of Appalachian residents from all demographic groups present in the population.

Western Civilization students continue to develop analytical and writing skills within a context of social, economic, intellectual, cultural and religious studies as we consider the various cultures of our Western Heritage. There has been an increased emphasis on student-led discussions and on the creation of a community of learners focused on a specific historical theme or situation. Based on the results of this increased emphasis from academic year 2007-2008, substantial changes are planned in the approach to the course in the 2008-2009 academic year. These changes include a common theme of study each semester for each course (*e.g.* the effects of war on human society in each time period/culture we study) as a means to focus discussions and writings across the expanse of time covered in the course.

World Civilization students also continue to develop their analytical skills in various written and oral assignments. Similar changes to the approach of this course are also planned in the 2008-2009 academic year. The guiding light of the course increasingly is the study of global history within a context intended to broaden the intellectual horizons of students. At the same time, World Civilization will continue to seek ways to link our region to the global community through the study of different cultural traditions.

Making Research Count

Methods of Research has launched successfully this spring! By exploring the extensive corridors of the library, Internet, and databases, students have learned to recognize quality research by evaluating the source's content, author's credentials, and dates of publication. Currently, students are finishing audio recordings of their latest individual research using Audacity for these sound recordings to add sound effects enhancing their presentations. Consistently since the class began, students have been developing and fine-tuning MLA, APA, and CMS skills. Students are mastering Boolean searches that include complicated research syntaxes. With a month of the semester remaining, Methods of Research will further explore online databases and dive into more difficult aspects of research like qualitative and quantitative research. In April, students performed field research as they explored the research methods of observation and interviewing and compared their data to similar research data. The class will end in May when students will write comprehensive essays about their learning experiences in Methods of Research. Mrs. Wilson expressed her pleasure with the launch of Methods of Research this spring, and looks forward to its second take this fall.

Gifted Students of the A. Linwood Holton Governor's School Gained Valuable Experience During Their Fall and Spring 2007-2008 Field Trips

On November 18th and March 2nd, **Anatomy & Physiology** students went to the Eastern Virginia Medical School in Norfolk, Virginia. Students were divided in groups: 10:00 and 11:40 classes (66 students) went in the fall and 7:20 and 8:20 classes (57 students) in the spring. The purpose of each trip was to allow students to apply what they have learned in class to real life. Much time was spent in the gross anatomy laboratory where students were able to observe the internal and external anatomy of the human body. Several medical students participated as well and also were available to answer questions. This helped the HGS students see that they really were not much younger than the medical students. Holton Governor's School students now realize they could also be medical students. Presentations were made that explained some of the latest research at EVMS. Medical librarians explained their role in gathering background information for the physicians conducting the research. The physicians in the pathology area shared their expertise of diseased and healthy organs and tissues. Students also witnessed an autopsy and participated in determining the cause of death. The experience at EVMS was the highlight of the course! The students also were very happy to get to see each other and to spend three days together.

Students from A. Linwood Holton Governor's School traveled to Green Bank, West Virginia with their science instructor, Dr. Steve Rapp, and ended up exploring the far reaches of the Milky Way Galaxy during the weekend of March 14-16. The participants included seventeen students from Dr. Rapp's **Robotics, Physics, and Astronomy** classes. The students used a 13 meter radio telescope to help answer two basic questions they had about the Milky Way Galaxy. They wanted to know if the Earth was located in one of the spiral arms of the galaxy and if the galaxy was rotating.

Holton Governor's School students gathered over 50 sets of data concerning the motion of Hydrogen in the Galaxy. Hydrogen emits radio waves at a frequency of 1420.41 MHz. By pointing the telescope at different Galactic longitudes and gathering data about the frequency shifts of the Hydrogen, students discerned that the Milky Way is indeed rotating. If they detected a blue shift (when the frequency of the detected Hydrogen was above 1420.41 MHz) this meant that the Hydrogen gas was moving toward Earth. If a red shift was detected this meant that the frequency of Hydrogen was less than 1420.41 MHz, and the gas was moving away from Earth. Students also detected clumps of Hydrogen atoms in the Milky Way at periodic intervals. This allowed them to deduce that the Milky Way Galaxy is indeed a spiral galaxy and that the Earth was located in one of spiral arms. Dr. Rapp's students were scientists for the weekend, collecting and analyzing data, and finding evidence to answer their questions about the universe!

Student Reflections

Wedded Alumni

My name is Jacob Yates (Clintwood High School '03) and I was enrolled in the A. Linwood Holton Governor's School during my junior and senior years. I have taken fiber optic classes, traditional classes, classes in a more traditional online format, and a television/video class. None of these methods, however, delivered the same exciting content as the classes I took at HGS, and I am still very thankful for my experience.

After high school, I attended Tusculum College in Greeneville, Tennessee where I majored in both Political Science and History. And thanks in no small measure to the credits I earned while at HGS, I was able to complete my degree in three years.

Upon graduation from Tusculum, I began working toward a Master of Arts degree in Christian Studies at Trinity Evangelical Divinity School in suburban Chicago where I have focused my studies on the history of the Christian church. I anticipate finishing my degree in August, and I am looking forward to returning to warmer climates south of Illinois. But this is only half of my story…

My name is Kim (Mullins) Yates and I too was enrolled in HGS during my senior year at Clintwood High School during 2002-2003. I was able to take Anatomy and Physiology with Mrs. Karen Smith, which was a great experience. I still appreciate what I learned in that course and recall how interesting it was to meet so many students in person on our field trip to the Bowman-Gray School of Medicine which I had only known by voice previously.

I also attended Tusculum College where I studied English Literature. I graduated in three years and took a year off in order to get some work experience. I am now completing my Master of Arts in Education degree with the hopes of one day teaching in an environment much like HGS. I have a passion for working with gifted students and I love the online educational environment. After finishing my master's degree, I plan to pursue a certificate program at George Mason University in secondary distance education. I am forever grateful to HGS for providing me with the opportunity to fall in love with distance education which has helped guide me in my chosen career path.

Kim and Jacob: Sweet Memories!

Although you may have guessed it by now, we two HGS alums are now husband and wife. We were married on July 14, 2006 and have lived our entire married life here in northern Illinois near Trinity. We are planning to return to Virginia this summer, where we will await the arrival of our first child this November. We are two truly blessed people and are so thankful that we had the opportunity to be a part of such a great place as the Holton Governor's School!

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Thank You for your commitment!

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Castlewood High
Chilhowie High
Clintwood High
Coeburn High
Council High
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Galax City High
Gate City High
Graham High
Grayson County High
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Haysi High
Holston High
Honaker High
Hurley High
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Tazewell High
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Twin Springs High
Twin Valley High
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Our Mission:

Is to provide **challenging learning opportunities** for the gifted & talented students of far Southwest Virginia that are not available to them in their regular school program.

We will accomplish this by **strengthening their abilities** and **nurturing their social and emotional well being** - through **mentoring, rigorous academic courses, service to the community, and leadership training** within an *entrepreneurial culture that encourages* ***creativity, initiative, and problem solving.***

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