

College of Science and Technology Annual Report for 2014 -2015

The College of Science and Technology (CSAT) at Radford University (RU) was formed on July 1, 2007 by combining the Departments of Biology, Chemistry and Physics, Geology, and Mathematics and Statistics from the former College of Arts and Sciences and the Department of Information Technology from the former College of Information Science and Technology. On July 1, 2009, the Anthropology and Geography programs from the College of Humanities and Behavioral Science joined the Physics and Geology programs of the CSAT to form the School of Environmental and Physical Science (SEPS) in the CSAT. The Anthropology program was approved by SCHEV to become the Anthropological Sciences program on May 10, 2010. The Geography program was approved by SCHEV to become the Geospatial Science program on May 17, 2011. The faculty within the SEPS passed a motion to dissolve the SEPS with a director and to create departments with chairs on September 9, 2011. In a SEPS faculty meeting on November 11, 2011, Provost Minner announced that he had approved the proposal of the SEPS faculty members to form independent departments of Anthropological Sciences, Geology, Geospatial Science and Physics with individual department chairs as well as a laboratory coordinator position to serve the needs of the Anthropological Sciences, Geology, Geospatial Science and Physics Departments.

MISSION

The College of Science and Technology prepares students with skills and expertise essential to the Commonwealth and the nation. The College emphasizes the theory and applications of science, mathematics, and technology. The College develops students' creative and critical thinking skills and teaches students to analyze problems and implement solutions to a vast array of challenges in our local, national and global communities. Students will be prepared to bring creative and socially responsible innovations to the workplace and to society.

UNDERGRADUATE DEGREES AND CONCENTRATIONS IN 2014-15

- Anthropological Sciences - concentrations in General Anthropology, Field Archaeology and Forensic Anthropology
- Biology with concentrations in General Biology, Molecular Biology, Environmental Biology, Pre-health and Biology Medical Laboratory Sciences
- Chemistry with concentrations in Professional Chemist, Pre-health Professional, Biochemistry and Forensics as well as an Environmental Science option
- Computer Science and Technology with concentrations in Computer Science, Database, Software Engineering and Networks
- Geology with concentrations in General Geology, Engineering and Environmental Geosciences and Earth Sciences
- Geospatial Science with concentrations in Environmental and Geoinformatics
- Information Science and Systems with concentrations in Information Systems and Web Development
- Mathematics with concentrations in Applied Math, Statistics and Secondary Education
- Physics with concentrations in Physics Education and Earth and Space Science

GOALS AND ACCOMPLISHMENTS FOR 2014-2015

These goals are based on the roles and responsibilities of deans as described in section 4.1.3.1 on page 62 of the Radford University Teaching and Research Faculty Handbook.

- to lead the faculty and staff of the college in developing and delivering educational opportunities of the highest quality possible for students, consistent with the mission of the College,

Goal: Support efforts to enhance student recruitment through collaborations with the Radford University Office of Admissions and other partners

Status: Numerous efforts have been made in 2014-15 to enhance student recruitment. Direct collaborations with the Office of Admissions include traveling with Dean James Pennix to Southwest Virginia Governor's School on August 28, 2014 where I met with 18 prospective new students and described the opportunities available to them in the CSAT. I also traveled to Roanoke on March 1, 2015 and to Raleigh, North Carolina on March 22, 2015 to participate in Office of Admissions Spring Yield Events for admitted students.

During the morning of February 28, 2015, Dr. Jason Davis, Dr. Stockton Maxwell and I participated in the Radford University Scholars Day Program and met with the new CSAT students and their families who attended. During the afternoon of February 28, 2015, the CSAT department chairs, selected faculty and I participated in the annual CSAT Open House event where we welcomed over 200 guests to campus that included 54 accepted students and 160 of their family members to meet CSAT faculty and students and tour our facilities.

Other recruitment efforts made in collaboration with the Office of Admissions include writing letters to admitted students and confirmed students to welcome them to the CSAT as well as sending postcards prepared for admitted students based on the departments in which they have declared their majors. David Horton has also designed a special website at the following URL: <http://www.radford.edu/csatswelcome> which welcomes new students with information describing the enrichment opportunities they can experience as majors in the CSAT.

Four students in the Information Technology Department have made plans to travel to their former high schools and present information about the Information Technology Department and the enrichment opportunities provided to them through cyber security research projects such as "Hack House." John McGee, Instructor of Mathematics and Statistics, traveled with mathematics majors Benjamin Brumback and Hannah Mitchell to Centreville High School in Clifton, Virginia to represent the Math Club and make presentations about the Mathematics major and opportunities for research with faculty members in the Mathematics and Statistics Department here at Radford.

Susan Underwood and I have met with Charlene Dandrow and Rhonda Conner in the Language and Culture Institute numerous times to support the Brazilian Scientific Mobility Project, and there are currently plans for eleven students from Brazil to enroll in upper-level courses in the CSAT during 2015-16 as special non-degree seeking students. I also consulted with Dr. Wei-Chi Yang and Dr. Yong Xu in the Department of Mathematics and Statistics to seek their advice on strategies to recruit Asian students to Radford, and those discussion will continue.

The CSAT also fully participated in Transfer Connect on Friday, January 30, 2015 where many

CSAT faculty members and I met with community college advisors and transfer counselors. Finally, Dr. Prem Uppuluri in the Department of Information Technology is making efforts to recruit Information Technology students through teaching ITEC 145 online to students in Southwest Virginia Governor's School and Shenandoah Valley Governor's School in spring 2015. He is currently making plans to expand his teaching of ITEC 145 to include Montgomery County Public Schools and Radford City Public Schools.

Goal: Support efforts to enhance student retention through collaborations with the Radford University Office of Student Retention and other partners

Status: Susan Underwood, CSAT Advising Center Coordinator, Tiffany Lide, CSAT Advising Center Assistant Coordinator, and I attended a Noel-Levitz Advising Retreat on Monday, December 8, 2014 where we discussed best practices and common concerns with advising policies and strategies. Susan Underwood, Tiffany Lide and I attended a Noel-Levitz Data Workshop on January 13, 2015 to understand how Noel-Levitz analytical resources could be used for enhanced and proactive advising in an effort to increase retention. I determined this workshop to be so valuable that I invited Dr. Steve Lerch, Mike Dunn, and Brianna Ruggles from the Office of Retention and the Office of New Student Programs to make a presentation to the CSAT Leadership Team on February 18, 2015. I also attended a meeting with Dean Irvin Clark and Lauren Hatfield on February 12 to discuss how the CSAT could partner with the Division of Student Affairs to promote retention initiatives, and based on the success of that meeting, I invited Lauren Hatfield to make a presentation on her efforts in the Division of Student Affairs to enhance student attendance and retention to the CSAT Leadership Team on March 4, 2015. I also met with Dr. Christine Small, Ms. Susan Underwood, Ms. Susan Hudson, Dr. Steve Lerch and Mike Dunn on Monday, February 23 to discuss Biology majors retention issues specifically.

Goal: Support the development and enhancement of innovative instructional methods and learning opportunities

Status: Faculty members in the CSAT submitted proposals that were supported by a combination of funds provided by Provost Minner and the CSAT. There were two CSAT Recruitment and Retention Grants projects funded for a total of \$3,553. These projects included the following.

Dr. Prem Uppuluri, Dr. Jeff Pittges and Dr. Joe Chase, \$2,400, Recruiting Cyber Security Students Using *Hack House*

Dr. Brett Taylor, \$1,153, Building a Thriving Undergraduate Physics Program at Radford University

There were two CSAT Pedagogical Initiatives and Innovations Grants projects funded for a total of \$1,850. These projects included the following.

Dr. Matt Close, \$850, 3D Printing as an Alternative Learning Tool

Dr. Sara O'Brien, Dr. Hwajug Lee and Dr. Hilary Lips, \$1,000, Shared Success: Issues of Gender Disparity and Lack of Diversity in STEM

RU Faculty Research Grants were provided to Dr. Laura Gruss, Dr. Joel Hagen, Dr. Georgia Hammond, Dr. Sara O'Brien and Dr. Rhett Herman, Dr. Tara Phelps-Durr, Dr. Bob Sheehy, Dr.

Beth McClellan, Dr. Jeff Pittges, Dr. Prem Uppuluri, Dr. Joe Chase and Dr. Jeff Pittges, and Dr. Hui Wang. Three of these grant projects provide stipends for students to conduct this research with their faculty mentors.

Funding from the CSAT Dean's Office budget was provided to Dr. Rhett Herman in the Physics Department and to Dr. Bob Sheehy in the Biology Department to repair research equipment.

Funding from the CSAT Dean's Office budget was provided to the Department of Information Technology to assist with installing a glass viewing window in the ARTIS Lab.

Funding from the CSAT Dean's Office budget was provided to the Department of Geospatial Science to pay faculty stipends for the development of online courses.

Funding from the CSAT Dean's Office budget was provided to the Department of Chemistry to pay for the license renewals of specialty chemistry software.

Funding from the CSAT Dean's Office budget was provided to the Department of Biology to purchase space heaters for vertebrate research lab spaces that required supplemental heat and to correct IACUC compliance issues in the biology lab at Selu Conservancy.

Funding from the CSAT Dean's Office budget was provided to the Department of Mathematics and Statistics to purchase a multimedia system and television monitor for the Mah Room that is used as a tutorial space.

Goal: Support the development of graduate degree programs and curriculum

Status: The Department of Information Technology has submitted the M.S. degree in Data and Information Management proposal to the State Council of Higher Education for Virginia (SCHEV), and that proposal is being review by the SCHEV staff. This degree program will be the first graduate degree awarded exclusively in the College of Science and Technology and the first graduate degree in Data and Information Management in the Commonwealth of Virginia.

Dr. Donna Boyd has proposed an innovative M.S. in Biomedical and Forensic Science degree program that would be the only forensic science graduate degree program in western Virginia. This interdisciplinary graduate degree program would provide students core courses in Forensic Science and elective courses in disciplines such as chemistry, biology and criminal justice. This M.S. in Biomedical and Forensic Science degree proposal has been approved by the CSAT Curriculum Committee and the Graduate Affairs Council.

Goal: Explore enhanced opportunities for student professional and personal development in collaboration with the Career Center and other appropriate units

Status: Dr. John Liptak, Associate Director of the Career Center, has partnered with the CSAT to conduct weekly "in college" office hours that are convenient for CSAT majors in Stuart Hall lounge on Wednesdays from 8 a.m. until 5 p.m. and on Thursdays from 10 a.m. until 3 p.m. in 113 Davis Hall.

The CSAT collaborated with the RU Career Center to host the first annual STEM Career Fair on Wednesday, November 5, 2014 from 11 a.m. until 2 p.m. in the Bonnie Hurlburt Student Center. Eighty-five students from the College of Science and Technology along with others from across

the RU campus participated with representatives from *eIntern* based in Fairfax, *Modea* located in Blacksburg, *Radford City Schools*, *Tech Dynamism* from Charlottesville, *TechLab, Inc.* from Blacksburg and Radford, *TEDS, Inc.* from Atkins, *CGI* from Lebanon, Virginia and *Eastman* from Kingsport, Tennessee.

- to lead the College in procuring and managing fiscal, human, and physical resources necessary to accomplish these goals,

Goal: Pursue acquiring new faculty and administrative support positions

Status: New faculty positions have been approved for the Department of Chemistry as part of the Pathways to Excellence initiative that was proposed by Provost Minner and approved by the RU Board of Visitors. During the 2014-15 academic year, searches were successfully conducted to hire an Inorganic Chemist and an Analytical Chemist, and both of these new faculty members will be starting in August 2015. Funds have been approved to start the search for an administrative assistant and an instrument technician for the Department of Chemistry in support of the application for the Department of Chemistry to achieve American Chemical Society approval, i.e. accreditation. Searches are authorized to begin for these positions in the spring of 2015 with hires dates starting as soon as July 1, 2015. Funds have also been authorized to start searches in the fall of 2015 for an Organic Chemist and a Biochemist who be hired to start in August of 2016.

Goal: Pursue new relationships with corporate partners and continue to pursue gifts to the CSAT and its facilities and outreach efforts

Status: The CSAT and Department of Information Technology have been very fortunate to receive extremely generous gifts during 2014-15 from two of our most dedicated donors, Dr. Pat Artis and Mrs. Nancy Artis, '73. Dr. and Mrs. Artis have pledged \$100,000 to provide the specialized Steelcase laboratory furniture for the ARTIS Lab and \$20,000 to renovate an adjoining space to create the ARTIS Lab Conference Room. The ARTIS Lab is a premier research and teaching facility that was made possible by the designation of space to the CSAT by President Kyle and Mr. Richard Alvarez. The dedication of the ARTIS Lab was a significant event during the Fall 2014 Homecoming and Family Weekend activities, and we were honored to have the ARTIS Lab dedication ceremony remarks delivered by President Kyle.

I collaborated with Ms. Robyn Porterfield, Assistant Vice President for Advancement, to submit a proposal to the American Electric Power (AEP) Foundation to fund numerous outreach programs of the CSAT, and we were honored to receive a very generous gift as well as to establish a partnership with AEP as a new funding partner during 2014-15. AEP funded our proposal to support the Science Days outreach program with an award of \$10,000. These funds will be used to support the outreach programs of the RU Planetarium, the Museum of the Earth Sciences, and the RU Greenhouse as well as the Magic of Chemistry demonstrations.

Through the efforts Robyn Porterfield, David Horton and me, we have been successful again during 2014-15 in obtaining very generous support from corporate partners and individuals to fund the Summer Bridge Program during July of 2015. The amount of gifts from donors during 2014-15 to support the Summer Bridge Program in July of 2015 currently totals \$61,000 with a proposal for \$10,000 pending. The generous donors during 2014-15 include the Jessie Ball

DuPont Fund for \$25,000, and a new partner, BAE, who has provided a \$12,000 gift to establish a Chemistry track. We were fortunate to receive a \$10,000 gift from the Zoe Poole Foundation again this year as well as generous gifts from many of our long-standing partners including ATK, Novozymes Biologicals, AREVA, Lynchburg Community Trust, and Ms. Dale Parris.

I also attend RBTC events such as the Tech and Toast breakfast program on June 26, 2014 and the RBTC Fall Gala to cultivate prospective donors for the CSAT and the ARTIS Lab.

Ms. Robyn Porterfield and I met with CSAT Advisory Council member and RU chemistry alumnus Mr. Mark Hanna, '84, on April 21, 2014, and he made a very generous pledge of \$10,000 to purchase a Periodic Coffee Table that will be a prominent teaching tool and a beautiful item of furniture on the main street level of the Center for the Sciences.

Goal: Support the efforts of faculty members to achieve a goal of 26 external grant submissions and 13 external grant awards

Status: From July 1, 2014 through March 24, 2015, 17 external grant proposals have been submitted by CSAT faculty members based on information provided by the Office of Sponsored Programs and Grants Management. These 17 external grant proposals represent funding requests of \$2,880,964. Nine external grants have awarded from July 1, 2014 through March 24, 2015 that represent \$433,081.

The efforts of the CSAT faculty to submit external grant proposals have been enhanced in 2014-15 by Dean Dennis Grady who provided reassigned time and other support to Dr. Jeremy Wojdak, Dr. Prem Uppuluri, Dr. Anthony Dove and Dr. Stockton Maxwell for them to pursue writing external grant proposals.

From July 1, 2013 through March 24, 2014, 17 external grant proposals have been submitted by CSAT faculty and staff based on information provided by the Office of Sponsored Programs and Grants Management. These 17 external grant submissions represent funding requests of \$3,913,708. From July 1, 2012 until March 28, 2013, there were 17 external grant proposals submitted worth \$2,378,744. Six external grants have been awarded from July 1, 2013 through March 24, 2014 that represented \$293,656 in funding. From July 1, 2013 until March 28, 2013, four external grants were awarded that represented \$107,346 in funding.

- to represent the college, its goals and needs to other external as well as internal constituencies, and

Goal: Continue to communicate with all constituents of the CSAT through the CSAT newsletter and alumni newsletter, CSAT website, CSAT Facebook page and by meeting with departments and faculty members

Status: The CSAT newsletter *From the Dean's Desk* that is written and designed by David Horton, Assistant to the Dean, continues to be successful in communicating news to CSAT faculty, staff and friends. David has expanded *From the Dean's Desk* from a four page newsletter to nearly a magazine that often exceeds fifteen pages and is content, graphic and photographic intensive. Editions of *From the Dean's Desk* are made possible by the faculty, staff and students of the CSAT who report their successes to David for inclusion in the newsletter. David has also enormously enhanced the CSAT Facebook page and website by very

frequent updates that feature articles, videos, photographs and links to CSAT faculty and students activities. CSAT holiday greeting cards were mailed to donors who had made contributions to the CSAT in 2014.

During the fall 2014 semester I met with every CSAT department during October to discuss their 2012-13 Program Review Annual Report that they had submitted the previous spring. During this meeting we discussed their enrollment trends as well as other department concerns. During the month of November in 2014, David Horton and I met with every CSAT department to discuss their ideas for departmental publicity materials and department marketing strategies.

- to promote the overall excellence and welfare of the University

Goal: Support positive morale among faculty and staff across the CSAT by listening to faculty concerns and soliciting faculty input in decisions affecting the CSAT

Status: I continue to meet with CSAT faculty ranging from individuals with specific requests to concerns from departments during 2014-15. The meeting agendas ranged from requests for resources to concerns raised by students and parents to performance evaluations issues and meetings at the Office of Human Resources where I advocate on behalf of individual faculty members. I also write many letters of support for many faculty members to assist in their applications for grant proposals and nominations for awards.

Goal: Support efforts to engage alumni in the work of the CSAT

Status: The College of Science and Technology alumni events during the 2014-15 academic year included the annual meeting of the CSAT Alumni Advisory Council that was conducted from in 014 Heth Hall on Friday, October 10, 2014. We were honored to welcome a new member to the CSAT Advisory Council, Ms. Nancy Artis, '73. An update was provided from the dean and the department chairs on events and activities within their departments. We were also joined by Ms. Laura Turk, Director of Alumni Relations, Ms. Robyn Porterfield and Ms. Joanne Royaltey. The meeting ended with a tour of Walker Hall and presentations on flipped classroom instruction and pedagogical enrichments from faculty members of the Department of Mathematics and Statistics.

Goal: Support efforts to enhance the academic reputation of the CSAT and Radford University

Status: The academic reputation of the CSAT and Radford University is enhanced by the achievements of the faculty and students of the CSAT. I am privileged to represent the CSAT and to share the achievements of the faculty, staff and students.

A significant achievement for the CSAT and Radford University occurred on September 16, 2014 when the diligent efforts of Dr. Donna Boyd were realized by the installation of a chapter of Sigma Xi, The Scientific Research Society, at Radford University. This achievement is additional external validation of the quality of scientific research at Radford. We were honored to have welcome remarks provided by Provost Minner and the keynote address provided by Dr. Mary Jensvold, Associate Professor of Anthropology at Central Washington University.

The academic reputation of the CSAT and Radford University were enhanced by Dr. Jill Stewart, Dr. Donna Boyd, Dr. Christine Hermann, Dr. Hwajung Lee, Dr. Sara O'Brien and me by the presentation of "The Gender Gap: Where the Girls Aren't" on Wednesday, October 15, 2014. This panel presentation was a contribution from the CSAT to the Radford University Fall 2014 Diversity Awareness and Celebration Week events. Dr. Donna Boyd and Dr. Sara O'Brien will also be making the presentation "Women in STEM Professions - Opportunities, Challenges, Strategies for Success" on March 27, 2015 as a CSAT contribution to Women's History Month.

The academic reputation of the CSAT and Radford University was enhanced by the CSAT faculty members and students who participated in the Virginia Science Festival that was conducted in Blacksburg on October 4, 2014 and in Roanoke with Radford University as a satellite site on October 11, 2014. RU Professor of Physics, Dr. Rhett Herman was featured in a session entitled "Meet the Scientist - Geophysical Properties of Arctic Sea Ice" on Saturday, October 4th at 2:00 in the Drillfield Room of The Inn at Virginia Tech. Dr. Donna Boyd shared the work of the Radford University Forensic Science Institute on October 4, 2014 in the Moss Center for the Performing Arts at Virginia Tech. RU Biology students who conducted research with Dr. Jason Davis presented "ROACHZILLA: Bugs and Beyond" featuring information about the effects of royal jelly on Madagascar hissing cockroaches on October 4. Dr. Francis Webster and a group of fourteen RU chemistry students and alumni featured work on nanotechnology from the RU Department of Chemistry in downtown Roanoke on October 11, 2014.

The academic reputation of the CSAT is enhanced every time the CSAT faculty and students accomplish our teaching, research and service missions. Teaching successes include innovative pedagogical approaches such as flipping the classroom and assessing student learning through innovations such as Learning Catalytics. Research successes include faculty members who mentor student research and supervise their research presentations at national conferences and meetings. Service and outreach successes include all the science, technology and mathematics education and outreach events that are possible through the work of the CSAT faculty and staff. These events include but are not limited to Science Days sponsored by the Science Alliance of Geology, Physics, Chemistry, Biology and Anthropological Sciences. CSAT faculty members support the STEM Conference at the Southwest Virginia Higher Education Center in Abingdon. Study abroad trips to Barrow, Alaska where Dr. Rhett Herman, Ms. Mythianne Shelton and Mr. Dan Blake conducted geophysics and science education research with RU and Southwest Virginia Governor's School students enhance the academic reputation of the CSAT. The geological research conducted by Dr. Skip Watts and Mr. George Stephenson at Mountain Lake enhanced the academic reputation of the Department of Geology and the CSAT. The reputation of the Department of Geospatial Science is enhanced by the international research of Dr. Grigory Ioffe and "Geography Awareness Week" that was conducted from November 17-20, 2014.

Other educational outreach events sponsored and supported by the CSAT faculty include the AMC Mathematics Competition on Tuesday, February 3, 2015 that was coordinated by Mr. John McGee, Instructor of Mathematics. Another outreach and recruiting event for prospective students this spring was the Blue Ridge Highlands Regional Science Fair on March 6 and 7 that is co-directed by Dr. Christine Hermann and Dr. Kimberly Lane in the Department of Chemistry. CSAT faculty member Dr. Karen Powers, Dr. Christine Small, Dr. Neil Sigmon and Dr. Steve Fawthrop served as judges for the SuperMACC Tournament that was sponsored by the CSAT and

conducted on Monday, March 16, 2015. CSAT faculty members are planning to teach on Saturday, March 28, 2015 for the Science Exploration Day outreach event, and these include Dr. Ian Barland, Dr. Jack Brockway, Mr. Eric Weigel, Dr. Steve Lenhart, Dr. Andrew Ray, Dr. Neil Sigmon and Dr. Donna Boyd.

The academic reputation of the CSAT is also promoted to prospective students in grades 1-6 through Camp Invention that was conducted last summer during June 23-27, 2014. Summer Bridge Program enhances the academic reputation of the CSAT for high school girls. Summer Bridge Program was conducted from July 13-18, 2014, and the CSAT faculty members who taught courses in Summer Bridge Program were Dr. Rhett Herman and Ms. Andrea Kirtner, Dr. Beth McClellan and Mr. George Stephenson, Dr. Georgia Hammond and Dr. Kimberly Lane, and Dr. Hwajung Lee, Dr. Cliff Boyd and Dr. Donna Boyd. A new Environmental Sciences track was added to Summer Bridge Program in 2014 that was taught by Dr. Sara O'Brien, Dr. Stockton Maxwell and Ms. Carrie Case.

The academic reputation of the CSAT and the Department of information Technology is being enhanced by a state level cyber security contest that started on March 23, 2015 and is coordinated by Dr. Prem Uppuluri. Over 50 high school students are participating in this cyber security contest from high schools that include Thomas Jefferson School of Science and Technology, Mountain Vista Governor's School, Shenandoah Valley Governor's School, Southwest Virginia Governor's School, Radford High School and Stone Bridge High School.

Finally, members of the Radford University Cyber Defense Club enhanced the reputation of the CSAT when they learned in late November of 2014 that they had placed 6th among 43 schools in the CyberSEED CTF challenge at the University of Connecticut in October 2014. The RU Cyber Defense team was ranked higher than teams from Syracuse University, Penn State, and Brown University among many others.

Professional Development for 2014-15

Due to the impending budget cuts by the Commonwealth of Virginia proposed by Governor McAuliffe in late August and early September of 2014, I cancelled my plans to travel to a professional development conference. I participated in online webinars to enhance my professional development during 2014-15. I also taught BIOL 310-06 during the fall semester of 2014 as my annual contribution to teaching, and to save money from the adjunct budget, I am currently teaching BIOL 311-06 during the spring semester of 2015.