

Artis College of Science and Technology Annual Report for 2019-2020

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 with 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 CSAT, and on November 11, 2011, independent departments of Anthropological Sciences, Geology, Geospatial Science and Physics were formed. Anthropology was approved by SCHEV to become the Anthropological Sciences program on May 10, 2010, and Geography was approved by SCHEV to become the Geospatial Science program on May 17, 2011. On April 28, 2017, the CSAT was renamed the Artis College of Science and Technology (ACSAT) in honor of Dr. Pat and Mrs. Nancy Artis '73, who donated \$5 million to establish the Artis Endowed Scholarship Fund to provide scholarships to ACSAT majors. On July 10, 2019, Jefferson College of Health Sciences merged with Radford University to create Radford University Carilion in Roanoke, Virginia. As a result of the merger, twelve full-time colleagues in Biology, Chemistry and Mathematics and Statistics joined the Artis College faculty, and bachelor's degree programs in Biomedical Sciences and Medical Laboratory Science were added to the ACSAT curriculum.

MISSION

The Artis 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.

DEGREES AND CONCENTRATIONS IN 2019-20

- B.A. and B.S. in Anthropological Sciences with concentrations in General Anthropology, Field Archaeology and Forensic Anthropology
- B.S. in Biology with concentrations in General Biology and Medical Laboratory Science
- B.S. in Biomedical Sciences
- B.S. in Medical Laboratory Science
- B.S. in Chemistry with concentrations in Professional Chemist, Advanced Professional Chemist, Biochemistry: Life Sciences and Pre-Health, Advanced Biochemistry and Forensics as well as an Environmental Science option
- B.S. in Computer Science and Technology with concentrations in Computer Science, Database, Software Engineering and Networks
- B.S. in Cybersecurity
- M.S. in Data and Information Management
- B.S. in Geology with concentrations in General Geology, Engineering and Environmental Geosciences and Earth Sciences
- B.A. and B.S. in Geospatial Science with concentrations in Environmental and Geoinformatics
- B.S. in Information Science and Systems with concentrations in Information Systems, Healthcare Information Systems, Information Systems Decision Science, Information Systems Security and Web Design
- B.A. and B.S. in Mathematics with concentrations in Applied Mathematics, Statistics and Traditional Mathematics
- B.A. and B.S. in Physics with concentrations in Physics, Biophysics, Earth and Space Science and Physics Education

GOALS AND ACCOMPLISHMENTS FOR 2019-2020

These goals are based on the roles and responsibilities of deans as described in section 4.1.3.1 on page 69 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 the Office of Admissions, Artis College and departmental efforts to enhance recruitment and diversity of new students and transfer students

Status: Efforts continue in 2019-20 to enhance student recruitment. Examples of collaborations with the Office of Admissions include participating in all Highlander Day and Open House events as well as meeting with prospective students and their families to provide tours and specific information about opportunities in the Artis College. Other college events in 2019-20 that recruited new students include the Blue Ridge Highlands Regional Science Fair, the RUSecure Capture the Flag competition, the Summer Bridge Program and Cyber Camps. Dr. Christine Hermann, Chair of the Department of Chemistry, took a leadership role in formalizing partnerships with community colleges that have resulted in articulation agreements being signed with Lord Fairfax Community College on August 29, 2019, Virginia Western Community College on October 31, 2019 and New River Community College on January 10, 2020 to recruit transfer students to Radford University as Chemistry majors. Artis College department chairs have been working diligently with the Transfer Virginia initiative to establish partnerships with the VCCS. Phase 1 includes Biology, Chemistry, Geology, Information Technology and Mathematics, and phase 2 will include Computer Science, Geospatial Science, Social Sciences and Physics. On November 7, 2019 Radford University was awarded \$17.3 million in funding over the next 20 years from the Tech Talent Investment Program (TTIP), and Dr. Art Carter, Chair of the Department of Information Technology and Associate Dean of the ACSAT, co-authored the grant proposal that resulted in this award. The Department of Information Technology is working diligently to develop curriculum and recruitment strategies to enroll more students in Computer Science to fulfill the criteria of the TTIP. On February 27, 2020 I attended the inaugural Highlander Distinction Dinner to recruit prospective students to the Artis College, and I worked with University Relations to produce a welcome video for the virtual Highlander Day that was conducted on March 21, 2020, <https://www.radford.edu/content/admissions-landing/artis.html>. I am grateful to Dr. Jon Tso, Dr. Art Carter and David Horton, for creating and posting videos to enhance the virtual Highlander Day experience of our prospective students and their families on March 21, 2020.

Goal: Support the REALISE program and other partnerships to enhance retention of new students, transfer students and continuing students

Status: Artis College faculty and staff members are dedicated to enhancing retention efforts. REALISE continues to be a significant retention effort through the work of faculty who are creating an environment that is student-ready, welcoming and inclusive as well as developing curriculum with inclusive pedagogy. Components of the REALISE program include faculty development to support redesign of Biology, Chemistry and Physics introductory laboratory courses as well as workshops and training on inclusive pedagogy. The REALISE Students are contributing to retention efforts by supporting Artis College majors socially and academically. Other REALISE efforts to enhance

retention include administering a survey to students enrolled in Artis College courses to assess social psychology constructs that include sense of belonging, ability uncertainty, science identity and institutional commitment. The survey was authored by Dr. Jeanne Mekolichick, Associate Provost, Dr. Sarah Kennedy, Assistant Professor of Chemistry, and Dr. Anna Curtis, Postdoctoral Teaching Fellow in Chemistry during 2018-19. Artis College departments most closely associated with the REALISE grant were also provided their specific retention data to analyze and discuss at the REALISE Year Three Kickoff on August 16, 2019.

A new retention and student support effort was undertaken during 2019-20 by Dr. Brett Taylor, Dr. Jon Tso, Dr. Kristina Stefaniak, Dr. Tara Pelletier and Dr. Sarah Kennedy who attended a Council on Undergraduate Research (CUR) Broadening Participation Institute. These faculty members from four departments took the leadership to initiate Radford University Artis College Explorers of Science (RU ACES), and the inaugural RU ACES event was conducted at Selu Conservancy on August 31, 2019. RU ACES was designed to build community and instill confidence among Artis College new freshmen as well as to introduce them to faculty, students, resources and opportunities in Biology, Chemistry, Geology and Physics. The RU ACES program was supported by funding from the Artis College Dean's Office and Dr. Jeanne Mekolichick, Associate Provost of Academic Programs.

Radford University is partnering with Ruffalo Noel Levitz (RNL) to develop strategies at the university level for enhancing retention. I have participated in RNL briefings and provided the RNL presentation made to the Academic Affairs Leadership Team to each ACSAT department. I also provided Student Retention Predictor data and College Student Inventory data for each new freshman major in the departments, and I asked each ACSAT department to develop retention plans they could implement at the department level. These department retention plans were shared at the February 5, 2019 ACSAT Leadership Team meeting so we could learn from each other, and these department plans will be used to inform an ACSAT Retention Plan for review, approval and implementation.

I have explored an additional strategy for enhancing retention of Artis College new freshmen, and this proposal has been fully approved at all levels for implementation in August of 2020. This new strategy will use Mentor Collective to establish a system of virtual mentoring with upper-level Artis College majors serving as mentors for Artis College majors who join us in August of 2020 as new freshmen. The virtual mentoring will be through a Mentor Collect application for texting, and data will be provided as a dashboard to analyze trends and understand the needs of new freshmen majors in the Artis College so that new strategies for enhancing retention can be developed.

Goal: Support the REALISE program and other partnerships to promote diversity, inclusion, inclusive pedagogy and inclusive excellence

Status: The HHMI funded REALISE IE program provides professional development opportunities for faculty that includes diversity, equity and inclusion training as well as inclusive pedagogy. We are fortunate in the Artis College to have Dr. Sharon Jones provide workshops at the REALISE Year Three Kickoff on August 16, 2019 as well as Cultural Competency Workshops on October 18, 2019 and January 9, 2020. The Cultural Competency Workshop planned for March 27, 2020 had to be postponed due to Covid-19, and the Cultural Competency Workshop initially scheduled for May 14, 2020 may be postponed due to public health conditions. The Cultural Competency Workshops are scheduled for three years, with 2019-20 as year one with the theme of Awareness. Year two will focus on Knowledge in 2020-21, and the theme for year three during 2021-22 will be Skills. Funds

were also provided from the Artis College budget and the Office of Academic Programs to support a workshop in the Department of Chemistry to redesign the curriculum in Chemistry 112 during the summer of 2019. Significant efforts are also being made to provide faculty development in inclusive pedagogy to faculty learning community cohort members and other interested faculty members. These efforts include workshops on group work, team building and microaggressions as well as the STEM Ed reading groups.

I am also an appointed member of the Diversity and Equity Action Committee (DEAC), and DEAC is working diligently to draft a Diversity, Equity and Inclusion statement for Radford University.

Goal: Support efforts to achieve the University, college and departmental goals in the Radford University 2018-2023 Strategic Plan *Embracing the Tradition and Envisioning the Future*

Status: The faculty and staff of the Artis College are making significant contributions to achieving the goals of the Radford University 2018-2023 Strategic Plan *Embracing the Tradition and Envisioning the Future*. In a report submitted on May 15, 2019, the following goals were supported through the work of the Artis College.

Academic Excellence and Research Goal 1

- REALISE IE program is providing training and reassigned time for faculty to develop problem-based learning opportunities in introductory science lab courses.
- REALISE IE program has provided kickbox grant funds for faculty to develop inclusive pedagogy and problem-based learning instructional strategies for introductory science lab courses.
- Faculty from the Artis College developed curriculum for the Cybersecurity certificate that is provided as competency-based education by the Chachra IMPACT Lab.
- Faculty from the Artis College developed curriculum for the Geointelligence certificate that is provided as competency-based education by the Chachra IMPACT Lab.

Academic Excellence and Research Goal 3

- The B.S. in Cybersecurity degree was approved by SCHEV effective November 16, 2018 to initiate effective spring 2019.
- The Cyber Defense Club is a student organization that trains with a faculty coach and competes at cybersecurity events such as CyberSEED, the Cyber Fusion Conference and Virginia Cyber Cup Competition and the Mid-Atlantic Regional Cyber Defense Competition
- Faculty members in the Department of Information Technology contributed to the Commonwealth Cyber Initiative (CCI) Southwest Virginia (SW VA) node proposal. The CCI is a \$25 million project funded in the 2018-20 Virginia budget.
- Dr. Art Carter wrote the narrative and collaborated with the Office of Budget and Financial Planning to submit the institutional plans for the Tech Talent Investment Program proposal from Radford University. The core of Radford University's proposal is focused on partnering with the VCCS to develop a distance completion program for students from the VCCS to transfer to Radford University and complete a Bachelor's degree in computer science.
- Dr. Jeff Pittges conducted Cybersecurity camps for commuter students from Radford City Public Schools, Floyd County Public Schools and Pulaski County Public Schools as well as a residential summer camp for students from Lancaster County in the summer of 2019.
- Dr. Chester (Skip) Watts and faculty members of the Department of Geology conduct research in engineering geology and rock slope stability for the Virginia Department of Transportation as well as private companies through the Geohazards and Unmanned Systems Research Center.

- ITEC 145 Data Ethics, Privacy and Security is an online course designed for non-majors with limited background in Information Technology that fosters ethical behavior and introduces students to privacy and security issues of their personal data on mobile devices and social media.

Academic Excellence and Research Goal 4

- REALISE IE program is providing training and reassigned time for faculty to develop problem-based learning and inclusive pedagogical opportunities in introductory science lab courses.
- REALISE IE program has provided kickbox grant funds for faculty to develop inclusive pedagogy and problem-based learning instructional strategies for introductory science lab courses.

Strategic Enrollment Growth Goal 8

- REALISE IE program is providing training and reassigned time for faculty to develop problem-based learning opportunities and inclusive pedagogy in introductory science lab courses.
- REALISE IE program has provided training and leadership opportunities for Peer Role Models, now called REALISE Students, to contribute to the academic and social success of their peers.

Student Success Goal 1

- REALISE IE program is providing training and reassigned time for faculty to develop problem-based learning opportunities and inclusive pedagogy in introductory science lab courses.

The departments of the Artis College completed their strategic plans, and those plans have been compiled into a master spreadsheet from which a draft of the Artis College Strategic Plan has been developed. The work of editing and revision the draft version of the Artis College Strategic Plan continues with a goal of a version to submit to the Artis College faculty for final review and approval in August of 2020.

Goal: Support the Artis College programs at Radford University Carilion and their synergies with Artis College programs at Radford University

Status: As a member of the Academic Programs and Accreditation Subcommittee, I attended the weekly subcommittee meetings to contribute to the Jefferson College of Health Sciences (JCHS) merger process. I worked closely with Medical Laboratory Science Program Director Laura Link to communicate with the National Accrediting Agency for Clinical Laboratory Science in June of 2019 and transition the Sponsorship Application of the Medical Laboratory Science Program to Radford University. On July 10, 2019, the merger of Radford University with Jefferson College of Health Sciences became official to create Radford University Carilion (RUC) in Roanoke. Since the merger, I have worked with RUC administrative and instructional staff to establish budgets and to provide information and assistance as needed. On January 16, 2020, I was appointed to serve on the Integrated Services Steering Committee that is charged with discussing service needs provided by Carilion Clinic to Radford University. On January 22, 2020, I was appointed to serve on the Operations Advisory Group at RUC. The Operations Advisory Group exists to review current operations and discuss potential improvements to better serve students, faculty and staff at RUC.

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

Goal: Pursue new relationships with corporate partners and individuals to pursue gifts to the ACSAT

Status: New relationships with corporate partners have been developed during 2019-20 to benefit the Artis College students, faculty and programs. In collaboration with the Office of University Advancement and the Artis College Major Gifts Officer, Ms. Vanessa Conner, a proposal was submitted to Appalachian Electric Power Foundation to support the Summer Bridge Program. That proposal was funded for \$25,000, and a proposal has been submitted to Appalachian Electric Power to support Summer Bridge Program for 2020. Another new corporate partner who supported Summer Bridge Program was Walmart, who provided a \$1,000 gift. A total of \$71,700 was raised for Summer Bridge Program in 2019 from four corporate partners, two foundations, one nonprofit organization and three private donors.

Another new partner for the Artis College in 2019-20 was Lancaster County Virginia Education Foundation who contributed \$18,900 for high school students to attend a residential Cyber Camp in July of 2019 that was developed and directed by Dr. Jeff Pittges, Professor of Information Technology, and David Horton.

Another effort that supported Artis College students, faculty and programs in 2019-20 was the crowdfunding for the Arctic Geophysics Research Experience that exceeded its \$4,000 goal and raised \$4,425 from 28 donors. The Blue Ridge Highlands Regional Science Fair also raises funds to support the students who receive cash awards and travel to the International Science and Engineering Fair. In 2019-20, a total of \$7,439 was raised with \$1,439 from donors and \$6,000 from sponsors.

I also participated in the Highlander Family Tour to Raleigh, North Carolina, and with Vanessa to Dunwoody, Georgia and Charlotte, North Carolina during 2019-20 to further explore prospective partnerships and donations to the Artis College. I attended the Roanoke Blacksburg Technology Council (RBTC) TechNite Awards on May 3, 2019 in Roanoke to cultivate prospective donors for the ACSAT and the ARTIS Lab.

A new partnership is being developed with NCI Information Systems, Inc. in Reston, Virginia in collaboration with Dr. Angela Joyner. This collaboration has resulted in a Teaming Agreement that was signed on February 19, 2020, and we are hopeful for a successful partnership with NCI as they pursue a request for proposal from PD Acquisition, Logistics, and Technology Enterprise Systems and Services (PD ALTESS).

Goal: Support the efforts to achieve the University and college goals in the Capital Campaign

Status: I am working closely with the University Advancement senior leadership team and Vanessa on the Artis College participation in the Capital Campaign. On April 5, 2019, I made a presentation to the Capital Campaign Committee on behalf of the Artis College. On November 22, 2019, I attended the Capital Campaign Steering Committee meeting, and Vanessa and I met with the Artis College subcommittee to solicit their advice and support. Since the renovation of Reed and Curie Halls is now complete, new opportunities for named spaces exist, and both individual and corporate donors will be visited to solicit their support. As of February 5, 2020, the Artis College has received \$2,132,340 towards our Capital Campaign goal.

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

Goal: Communicate through the ACSAT newsletter, ACSAT website, ACSAT Facebook page and

by meeting with students, faculty, staff, alumni and donors

Status: The ACSAT newsletter *From the Dean's Desk* that is written and designed by David Horton continues to be successful in communicating news to ACSAT faculty, staff and friends. David makes every effort to include news from all departments of the ACSAT. David has tremendously enhanced the ACSAT Facebook page and website with frequent updates that feature articles, videos, photographs and links to ACSAT faculty and students activities. David also devoted a significant amount of time developing a YouTube channel and a Twitch channel for the Artis College that was used for live streaming the RUSecure Capture the Flag competition on April 27, 2019.

I meet with faculty and students at their request, and I conduct an open door policy for listening to input and for hearing faculty and student concerns.

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

Status: Artis College of Science and Technology alumni events during the 2019-20 academic year included the annual meeting of the ACSAT Advisory Council that was conducted on October 25, 2019. The annual ACSAT Advisory Council meeting included a panel presentation from our Advisory Council members to Artis College students as well as a tour of Reed and Curie Halls to view the progress of the renovation and to consider potential donors for naming spaces in our new facilities. I sponsored a table at the Women of Radford luncheon on October 26, 2019 to support our college's alumnae and donors, and I attended the Volunteer Summit on February 22, 2020 to network with alumni and volunteers who were in attendance.

I continue to work closely with Vanessa and the Office of Alumni Relations to communicate with our college's alumni, including participation in the Highlander Family Tour to Raleigh, North Carolina, Dunwoody, Georgia and Charlotte, North Carolina to further explore prospective partnerships and donations to the Artis College.

- to promote the overall excellence and welfare of the University

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

Status: I met with ACSAT faculty to discuss issues ranging from individuals with specific requests to department level issues, such as retention, during 2019-20. The meeting agendas included requests for resources, concerns raised by students and parents and Reed and Curie Halls renovation issues. I also write many letters of support for faculty members to assist in their applications for grant proposals and Faculty Professional Development Leave as well as nominations for awards.

A human resource concern was addressed in the Department of Biology during 2019-20 in collaboration with Interim Provost Colley. Funds were provided to convert the 9-month special purpose faculty position in Biology with the special purpose of managing the Center for the Sciences vivarium into a 12-month position to ensure adequate support for animal research during the summer.

In collaboration with Interim Provost Colley, I was able to address concerns expressed by members of the Institutional Animal Care and Use Committee (IACUC) in 2019-20. Funds were provided by Interim Provost Colley to establish a new budget ORG, i.e., 11727, that is specifically for Center for the Sciences vivarium expenses. Interim Provost Colley transferred \$2,500 into this vivarium budget

from Office of the Provost funds, and I have committed an additional \$2,500 from Artis College funds to support the vivarium expenses. This is a recurring budget of \$5,000 that is dedicated to providing resources for the research in the Center for the Sciences vivarium.

I consult the ACSAT Leadership Team frequently to discuss issues affecting the ACSAT faculty, staff and students, and I highly value and respect the input of the ACSAT Leadership Team in arriving at decisions through collaborative leadership and shared governance.

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

Status: The academic reputations of the ACSAT and Radford University are enhanced by the achievements of the faculty and students of the ACSAT. I am privileged to represent the ACSAT and to share the achievements of the faculty, staff and students. I participated in the Radford University MLK Day of Service on January 20, 2020 at the Unity Christian Church in Radford and assisted with painting to enhance the reputation of Radford University in the local community.

The academic reputation of the ACSAT is enhanced every time the ACSAT faculty and students accomplish our teaching, research and service missions. Teaching successes include inclusive pedagogical innovations and assessment strategies that enhance our teaching effectiveness. 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 ACSAT faculty and staff. A very successful outreach event in 2020 that enhances the academic reputation of Radford University 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.

The academic reputation of the ACSAT is also promoted to prospective students in grades 1-6 through Camp Invention that was conducted last summer during June 17-21, 2019. Summer Bridge Program enhances the academic reputation of the ACSAT for high school girls. Summer Bridge Program was conducted from July 14-19, 2019, and the ACSAT faculty members who taught courses in Summer Bridge Program were Dr. Rhett Herman and Ms. Brenda Hastings, Dr. Beth McClellan and Mr. George Stephenson, Dr. Kimberly Lane and Dr. Sarah Kennedy, Dr. Hwajung Lee, Dr. Cliff Boyd and Dr. Donna Boyd. The academic reputation of the Artis College and Radford University was enhanced by the RUSecure Capture the Flag competition that is co-directed by Dr. Joe Chase and Dr. Prem Uppuluri in the Department of Information Technology. The RUSecure Capture the Flag competition is a departmental outreach and recruiting effort for high school and community college students that has been conducted since 2017. This extraordinary outreach event on April 27, 2019 was promoted through an online streaming service called Twitch to reach a national audience. I was able to support the video documentary production of the RUSecure Capture the Flag competition in 2019 with funding of \$36,702 from the Artis College Foundation account.

Perhaps the greatest achievement in 2019-20 to promote the academic reputation of the Artis College and Radford University was the ribbon cutting ceremony on February 12, 2020 to acknowledge the completed renovation of Reed Hall and Curie Hall that represented a \$33,882,000 investment by the Commonwealth of Virginia. We were highly honored to be joined by President Hemphill and First Lady Marisela Rosas Hemphill, Rector Archer and members of the Radford University Board of

Visitors, Dr. Pat and Mrs. Nancy Artis '73, and many special guests of the Artis College and Radford University. This very special day in the life of the Artis College was made possible by the efforts of many contributors to the academic reputation of Radford University that included the faculty members who provided tours of their laboratories and facilities in Reed and Curie Halls to our guests.

Professional Development for 2019-20

I participated in online webinars on student retention strategies to enhance my professional development during 2019-20 as well as attended the annual Program Director meeting for the REALISE IE grant from HHMI during July 29-31, 2019. I traveled with members of the REALISE Leadership Team to present posters of our progress at the AAC&U Transforming STEM Annual Conference in Chicago during November 7-9, 2019. I also taught BIOL 310-07 during the fall semester of 2019 as my annual contribution to the teaching mission of Radford University.