BE BOLD

College of Sciences and Mathematics
Executive Summary

AUBURN UNIVERSITY



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Welcome from the Dean



Welcome to the Auburn University College of Sciences and Mathematics, or COSAM.

At COSAM, we encourage everyone to Be Bold in the pursuit of knowledge. From day one, we emphasize hands-on learning and research. Our cutting-edge laboratories, unique research opportunities, and high-impact on- and off-campus experiences provide students with immediate opportunities to apply their knowledge. Whether you are learning new skills in the classroom, collaborating with peers, or working alongside passionate faculty on groundbreaking research, you will be part of a dynamic environment where ideas become action.

In COSAM, we explore the building blocks of life in Biological Sciences, develop new materials to improve energy production and medicine in Chemistry and Biochemistry, investigate the forces that shape our planet in Geosciences, uncover the mysteries of the universe in Physics, master problem-solving in Mathematics and Statistics, and prepare for careers in healthcare through our Biomedical Sciences program.

We are committed to creating a community that combines rigorous academics with real-world applications, preparing the next generation of scientists and mathematicians to solve the complex problems of tomorrow.

We look forward to working with you on this bold journey into the future.



Edward Thomas, Jr., PhD ‘96
COSAM Dean and Professor of Physics

Vision:

Our Vision: COSAM will be a place that fosters a welcoming environment which empowers the next generation to enrich our world through transformative sciences and mathematics (Empower Innovation).

Mission:

Our Mission: To provide the foundation for all aspects of the land, sea, and space-grant mission of Auburn University by: (1) elevating student experiences through impactful courses and curricula, (2) pursuing transformative research in sciences and mathematics, and (3) improving the lives of the citizens of Alabama, the nation, and the world through life-changing outreach and service **(Inspire Excellence).**

Values:

Our Values:

1. Cultivating culturally competent professionals who will enhance awareness and appreciation of the world by broadening access, fostering community, and making a global impact in STEM.
2. Advancing scientific and mathematical knowledge by training the next generation of students to pursue their careers with the highest ethical and professional standards.
3. Elevating the public understanding of the natural world and using this knowledge to positively impact social, technological, and economic progress.

COSAM 2035 Strategic Plan

Strategic Plan:

Overarching Goal – Brilliant Student Experience:

1. **Goal-** Provide all Auburn students with a high-quality educational experience that produces successful graduates who can critically evaluate and apply scientific information in ways that advance society.
2. **Goal-** Cultivate and sustain a graduate student community that drives the growth of COSAM's research enterprise.
3. **Goal-** Recruit and retain student-centered educators committed to the University's land, sea, and space-grant mission.
4. **Goal-** Develop educational and curricular opportunities that address future-oriented needs of undergraduate and graduate students.

Overarching Goal – Outstanding Research and Innovation:

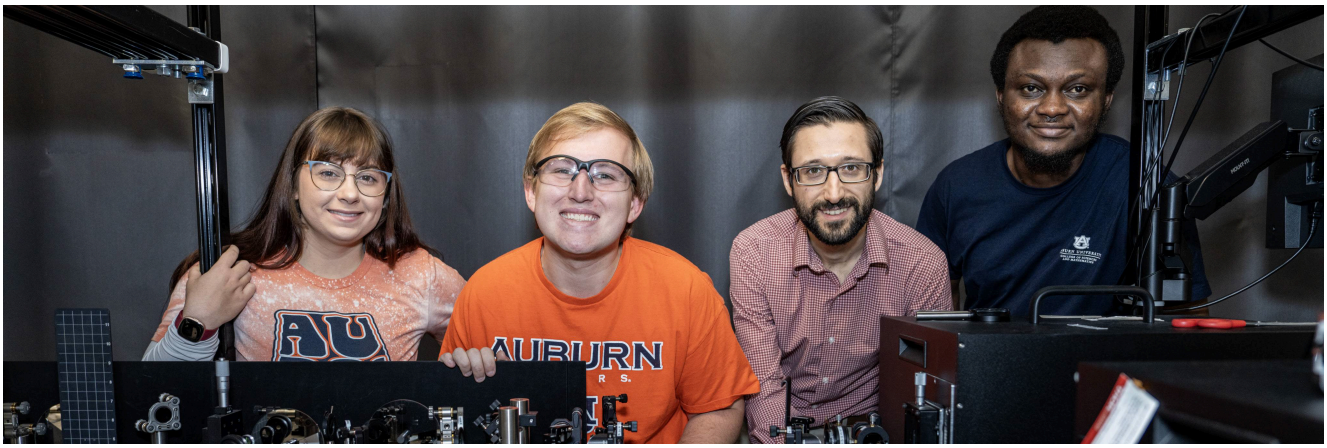
1. **Goal-** Engage in impactful research aimed at addressing fundamental and real-world challenges, in order to enhance the well-being of local, regional, national, and global communities.
2. **Goal-** Invest resources that support the development of faculty and staff to strengthen and expand COSAM's research enterprise.
3. **Goal**- Foster the development of graduate students and postdoctoral scholars to support research initiatives and enhance their careers.
4. **Goal-** Create an environment that supports undergraduate research opportunities.
5. **Goal-** Increase the visibility of COSAM research achievements.

Overarching Goal – Leading Faculty and Staff Support:

1. **Goal-** Foster a greater sense of community among faculty and staff across department and college levels.
2. **Goal-** Create an environment that supports staff advancement.
3. **Goal-** Foster the development of graduate students and postdoctoral scholars to support research initiatives and enhance their careers.
4. **Goal-** Streamline processes and procedures that support the mission of the college to achieve efficiency in all operations.

Overarching Goal – Distinctively COSAM:

1. **Goal**- Maintain and enhance COSAM's leadership in training the next generation of health professionals.
2. **Goal-** Establish a seamless pathway from K-12 to COSAM aimed at developing future science and math professionals and enhancing community scientific literacy.
3. **Goal-** Lead the way in equipping students and faculty to thrive in the era of big data.
4. **Goal-** Develop a compelling and recognizable identity that effectively communicates the unique COSAM story.
5. **Goal-** Maintain meaningful relationships with undergraduate and graduate alumni.



2035 Biomedical Sciences Strategic Plan

Program Identity, Reputation and Future Goals: The Biomedical Sciences (BMSC) Program is an interdisciplinary academic program supported by all five COSAM departments. This program is focused on providing students with optimal education and preparation in the biological, chemical and physiological underpinnings of human health and disease. Through coursework, laboratory experiences, and research opportunities the program prepares students for careers in healthcare, research, biotechnology and related fields or for further study in these areas. The BMSC program has a strong history and reputation of producing graduates who excel in professional schools and in health-related careers. BMSC is also the largest major in COSAM, accounting for an average of 60-75% of all majors. Thus, this program is of central importance to the college and to the university. The program goals are to not only maintain the stature and excellence of this program, and to provide unparalleled preparation for a variety of health-related fields, but also to enhance and modernize the curricula to set students up for maximal success in their careers in the 21st century.

Our Vision: To empower students to holistically improve human health through an interdisciplinary curriculum and transformative research experiences. (Inspiring Leaders in Health)

Our Mission: To provide a comprehensive foundation that prepares students for future success in careers related to human health by leveraging interdisciplinary expertise across the departments to provide students with rigorous coursework in both foundational and clinically related topics. To enrich their academic preparation, students will participate in high-impact practices that apply concepts to real-world scenarios through hands-on experiences gaining critical cultural competence skills. (Bridging science and Medicine for a Healthier Future)

Overarching Goal – Provide students with foundational knowledge in biomedical sciences.

1. **Goal-** Leverage existing strengths within COSAM to strengthen the BMSC curricula.
2. **Goal-** Diversify the concentrations available to BMSC students interested in health-related careers outside the “traditional” paths (medical/dental/optometry school).
3. Goal- Diversify the upper-level electives included in the BMSC curricula.
4. **Goal-** Promote student success by supporting high-impact practices that complement the academic curricula.

Overarching Goal – Strengthen and grow the BMSC program in line with University enrollment:˜

1. **Goal-** Market the program to enhance enrollment and participation.
2. **Goal-** Strengthen and leverage relationships with alumni and donors to enhance student scholarship opportunities, career awareness and success.
3. **Goal-** Retain students by providing inclusive, engaging, and supportive academic opportunities.

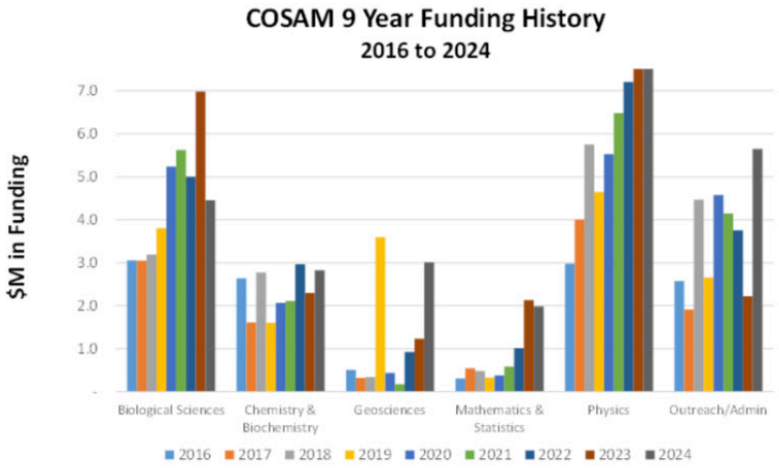
Overarching Goal – Cultivate a community of socially responsible, culturally competent and engaged students who actively contribute to positive change.

1. **Goal-** Increase awareness of outreach opportunities among students and emphasize the personal, academic, and professional benefits of participating in these activities.
2. **Goal-** Foster a sense of belonging and purpose by creating meaningful educational outreach opportunities aligned with students’ interests and academic goals.
3. **Goal-** Develop cultural competency in biomedical sciences students by equipping them with the knowledge, skills, and awareness necessary to understand, appreciate, and effectively engage with diverse cultural perspectives in healthcare.

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Office of Research and Graduate Studies

Growing Research Grant Funding: COSAM's greatest research strengths as a unit come from our people. Our faculty have been very competitive for prestigious grants, including over 20 NSF CAREER awardees and recently 4 NIH MIRA awardees. COSAM's grant funding continues to climb each year (Figure 1).



Research Community: COSAM has over 400 graduate students and a growing community of postdoctoral scientists. Last year COSAM researchers were awarded $27M in grants and COSAM is on track to exceed that number this year. That grant success has largely been driven by the success of individual PIs and reflects the very talented recent generation of COSAM faculty who have made great strides in their relatively short time at AU. Another COSAM strength is the strong biomedical sciences undergraduate program. These undergraduate students are a very impactful presence in the research labs of faculty in COSAM and across Auburn University.

Research Center and Institute Development: An important initiative for COSAM research is in forming, supporting and highlighting new Centers and Institutes, which will have academic missions in research, teaching and/or outreach. COSAM is now providing support to develop 8 Centers and Institutes. For our college to reach even greater heights we want to spur interactions among researchers, educators and outreach staff in COSAM, and in partner institutions in making connections by highlighting and supporting strengths of our college. By joining together we can achieve research and educational goals and impact countless people's lives in new and innovative ways. ˜

COSAM has pledged support for the development of 8 different Centers:

- **Biodiversity Center,** *Dr. Brian Counterman, Department of Biological Sciences:*
  - To be an entity that brings together researchers and teachers across AU campus that demonstrate our commitment to promoting biodiversity research, education, and outreach.

- **Center for Carbon Capture, Utilization and Storage,** *Dr. Bill Hames, Department of Geosciences*:
  - To promote teaching, research, and service in the scientific, engineering, and societal aspects of deep storage for CO2 in geologic reservoirs of southern Alabama, Mississippi, Georgia, and northern Florida at a GT/y scale.

- **Center for Methane Activation and Utilization,** *Dr. Evert Duin, Department of Chemistry and Biochemistry*:
  - To solve the long-standing problem of methane.

- **Center for Multiscale Modelling of Materials and Molecules,** Dr. Evangelos Miliordos, Department of Chemistry and Biochemistry and Dr. Marcelo Kuroda, Department of Physics:
  - To coalesce the efforts of different research groups dispersed on AU campus to establish an interdisciplinary space to advance the computational modeling of molecular systems and materials in different fields of science and engineering, promote the interaction between the different units across the University, and invigorate the education and training of undergraduate and graduate students in state-of-the-art computational techniques.

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- **Informal STEM Connectory,** *Mary Lou Ewald, Director of COSAM Outreach and Dr. Virginia Davis, Department of Chemical Engineering*:
  - To promote collaboration, synergy, and knowledge sharing among members of the Auburn Family interested in engaging in informal STEM Education. Advancing informal STEM education, also known as out-of-classroom education, is a particularly impactful practice because informal STEM has the potential to reach all Alabama citizens regardless of education or career path.

- **Integrated Data Science Innovations Center,** D*r. Nedret Billor and Dr. Elvan Ceyhan, Department of Mathematics and Statistics:*
  - To serve as a central hub for scientific research, technological advancement, and advanced education in data science at Auburn University by unifying the data science efforts under a campus-wide mission, accelerating and amplifying the impact of data science integration across all disciplines.

- **Plasma Science Center,** *Dr. David Maurer, Department of Physics:*
  - To bring together plasma researchers from Auburn University and around the country to leverage their existing activities and help enable the development of new promising ideas, approaches, collaborations, and initiatives to broaden our plasma science related research, education, and outreach activities at Auburn University.

- **Synthesizing Training, Research, and Education in Stress Science (STRESS) Center**, *Dr. Rita Graze, Department of Biological Sciences:*
  - To develop collaborative research programs connected to studying the biology of stress and its impacts, creating a concrete path for cross-disciplinary research across COSAM and ultimately for developing research programs linking basic research, applied sciences and biomedical research at Auburn.

These developing Centers and Institutes will help COSAM and AU to attract larger, multi-disciplinary funding grants and help to recruit and retain excellent researchers. COSAM forsees continue diversification of it's funding portfolio over 10 years, especially with growth areas in NIH-funded biomedical research and in DOD-, DOE- and NASA-funded research programs, to complement our traditional strength in NSF-funded research across all 5 COSAM departments. We welcome collaborative partnerships with institutions across many research disciplines in our 5 academic departments.

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Department of Biological Sciences

Mission:

The Auburn University Department of Biological Sciences (DBS) is dedicated to exploring and understanding the natural world and sharing knowledge through scholarly contributions and instructional programs. We seek to advance understanding in the Life Sciences by conducting cutting edge research and extending these discoveries to our students, the citizens of Alabama, and the global scientific community. Accomplishing this mission will enable current and future generations to address many of the scientific challenges to be faced in the 21st Century while concomitantly promoting the importance and power of basic biological research and natural history exploration.

Research:

DBS has 30 research focused faculty, 9 teaching focused faculty studying foundational research in five areas:

Host-Microbe Interactions: Areas of study include interactions between microorganisms (e.g., bacteria, protists, fungi, and viruses) and host organisms (e.g., animals, plants, parasites). Studying microbial community interactions using culture-independent and culture-based methods, detecting microorganisms, especially pathogens, and studying the ecological and immunology responses of these interactions.

Behavior, Ecology, Evolution, and Conservation: Areas of study include terrestrial, freshwater, and marine ecosystems, and model organisms span plants to invertebrate and vertebrate animals. Research questions focus on field studies of behavioral and population ecology, the evolution of life histories, quantification of natural selection in the wild, biotic responses to climate change, conservation of rare species, community dynamics, disturbance ecology, and ecosystem restoration.

Evolutionary Genetics and Systematics: Areas of study includes evolutionary diversification at multiple hierarchical levels; phylogenetic inference and its use in studying phenotypic character evolution, phylogeography, and classification; evolution of genomes; speciation theory; molecular ecology; the science of describing and classifying new species; and sexual selection and ornament evolution.

Physiological Adaptations and Functional Genomics: Areas of study include understanding basic mechanisms and physiological processes at both cellular and organismal levels in relation to biological function that occur in response to stress and environmental conditions and the use of genomics-based approaches to examine function of underlying biological mechanisms.

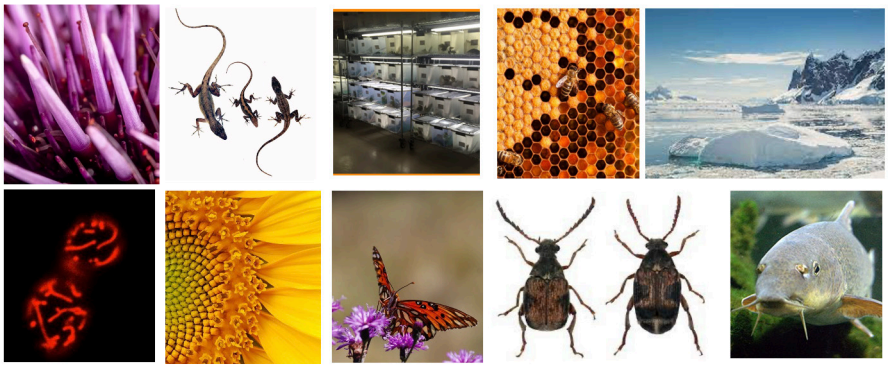
Discipline based education research, scholarship of teaching and learning, and instruction: This core is focused on enhancing the learning and outcomes for students through research and strategies for optimal operations and learning in large enrollment classes.

Impact:

Graduate training: DBS offers a PhD and MS program in Biological Sciences that currently enrolls 145 students. In addition, we offer a Computational Biology Certificate program for graduate students.
High-Impact Publications: DBS faculty, staff and students produce publications in spectrum of ournals including PNAS, Nature Communications, eLife, and Science.
Broad dissemination: Faculty and students present at invited speaking appointments, seminar visits, and other conference presentations totaling >270 engagements per year.
Diverse portfolio of funding: DBS has over $6M in extramural grants from NSF, NIH, NIFA-USDA, Natural Heritage program, smaller foundations, and private corporations.
Biodiversity and Conservation: DBS is also the home department for the Auburn University Museum of Natural History, which houses multiple a large specimen based collections, and the Donald Davis Arboretum.
Public engagement: DBS faculty, staff and students engage in outreach and community service in the Southeast of the US and across the world.

Teaching:

DBS is actively involved in preparing student for life-long learning in the life sciences through exemplary and innovative instruction within the context of the following four Bachelor of Science Degrees.
Microbial, Cellular and Molecular Biology: The Microbial, Cellular and Molecular Biology curriculum contains three Formal Options: Cell and Molecular Biology, Microbiology, and Microbiology Pre-Veterinary Medicine.
Organismal Biology: The Organismal Biology major has four Formal Options: Ecology, Evolution and Behavior, Conservation and Biodiversity, Integrative Biology, and Integrative Biology Pre-Veterinary Medicine.
Marine Biology: The Marine Biology curriculum prepares students for graduate work in the field of Marine Biology as well as employment with resource management agencies or facilities such as marine aquaria. Students take a suite of Marine Biology courses offered during summers at cooperating Marine Laboratories.
Genetics: The genetics curriculum provides a broad foundation in the biological, physical, and mathematical sciences fundamental to the study of heredity and evolution. The major is flexible to serve students interested in genetics, either as a basic discipline or in its application in biotechnology, agriculture, environment/conservation, and medicine



Funded research in the Biological Sciences uses organisms such as yeast, sunflowers, sea urchins, honeybees, anoles, butterflies, catfish, and beetles as models understand basic biology. Researchers in the department access field sites that extend from Alabama to Antarctica.

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Department of Chemistry & Biochemistry

Mission:

The Department of Chemistry and Biochemistry (DCB) mission is to (a) advance knowledge through cutting-edge research in the chemical sciences, (b) provide ground-breaking education for students in and out of formal classes, and (c) provide impactful service and outreach that benefits diverse groups of people in local and global communities. As a department we seek to pursue excellence in education and research in chemistry and biochemistry by: providing a quality educational experience; recruiting and retaining innovative faculty, staff, and students; being proactive to the needs of everyone in the department; nurturing growth through knowledgeable and supportive faculty and staff; making significant impact on our local and global community; fostering and rewarding collaborative and interdisciplinary efforts; and maintaining a cooperative, collegial, and collaborative environment for all.

Research:

DCB is divided into six traditional divisions (Analytical, Biochemistry, Inorganic, Organic, Physical, and most recently, Instructional); however, our research strengths are better understood as areas that span across these traditional lines. These include:

Bioinorganic chemistry and metal-ion driven catalysis- metalloenzymology, inorganic complex/enzyme mimic synthesis, methanogenesis, and methane utilization, oxidative stress management, secondary metabolite/natural product biosynthesis and application

Chemistry of materials- especially applied to synthesis and characterization of molecular and solid-state compounds for energy storage and conversion

Quantum theory and calculation- method development and application

Bioanalytical chemistry- ranging from modeling and evaluation of multi-tissue hormone signaling and diabetes to detection and differentiation of pathogens

Spectroscopy- Time-resolved fluorescence, impedance, ultrafast broad band vis/IR, etc.

Discipline-based education research- contributing to COSAM-wide initiative

Impact:

Faculty hiring over the last decade has added greatly to DCB's strengths in energy conversion/storage, bioanalytical, computational, synthetic organic, and bioinorganic chemistry. Toward the latter, DCB has built one of the strongest programs in the United States in metal ion-based catalysis that includes synthetic, biological, and bio-inspired components. DCB is the youngest department in our college, and one of the youngest chemistry departments in the southeastern United States. DCB and COSAM have helped to foster the successful initiation of these new faculty research programs. The average time to the first federal grant has decreased by a factor of two. Recent grants (> $11 M) have included multiple NSF CAREER and NIH MIRA awards for junior faculty. This has had a synergistic impact, enabling multiple mid-career faculty to revitalize their own research programs. In the coming years, DCB is anticipating the continuation of faculty hiring to build on the productive and energetic foundation we have established thus far. Support for research activities includes NMR, mass spectrometry, and x-ray diffraction service centers, along with research electronics support and glass blower.

Teaching:

The department is the sixth largest in delivery of student credit hours at Auburn with ~28,000 SCH/year. The department has built a strong and committed instructional division that has raised the level of instruction of DCB. This has not only been through innovations and improvements to instruction in the department's large-subscription courses (e.g., Fundamentals of Chemistry I and II, Organic Chemistry I and II, General Biochemistry I and II, etc.), but it has also extended throughout the department as it has contributed resources and assistance for interested faculty to innovate in their courses (e.g., flipped format, active-learning, etc.).

Future Ambitions:

Hiring: The faculty is composed of 7 assistant professors and 6 associate professors, 4 of whom have recently received tenure and promotion. The department has a vibrant and successful foundation on which to build that will extend 20+ years into the future. The goal is to reach 26 TTF by Fall 2029. Accounting for active searches (2), a net gain of 7 more TTF would be necessary. This is a great opportunity to substantially expand reach of the TTF and their research impact.

Instrumentation and Infrastructure: DCB continues leverage investments from Auburn University, the National Science Foundation and others to grow the instrumentation of the department. Recent instrumentation acquisitions include orbitrap LC-MS (2), GC-TOF-MS (2), LC-MS (1), ICP-OES, powder XRD, single crystal XRD, and 500 MHz NMR.



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Department of Geosciences

Mission:

The Auburn University Department of Geosciences offers undergraduate and graduate degree programs in Geology, Geography and Environmental Studies, and Earth System Science and undergraduate and graduate certificate programs in Geographic Information Systems Science. The department supports students in a unique learning environment that promotes team-based approaches to explore and solve problems across disciplines. Our department is made up of nationally recognized Geosciences faculty, staff, students, alumni, and community partners who explore dynamic issues of Earth, Environment, and Society.

Faculty and staff explore a range of specializations in the disciplines of Geography and Geology, two in-demand STEM (Science-Technology-Engineering-Math) fields at Auburn. We are committed to student excellence, research excellence, and teaching excellence. Auburn geoscientists are deeply invested in the land, sea and space grant missions of Auburn University. This includes a strong outreach and service commitment to the citizens of Alabama and beyond.

Research:

Directly linked to the department's educational programs is a nationally recognized, faculty-based- program of both basic and applied research, which expands our general geosciences knowledge base as well as addresses pressing societal needs. Department research and training facilities include elemental and isotope mass spectrometers, X-ray diffraction/fluorescence, geochronology labs, and field-based geophysical, hydrogeologic, and GIS and drone equipment. The department includes several active research and teaching themes demonstrating the breadth and depth of the Geosciences. These themes include, but are not limited to:

Earth and Life Through Time– Sedimentology/Paleobiology/Geomicrobiology

Environmental Geosciences– Climate/Hydrogeology/Environmental Geochemistry/Water Resources/Natural Hazards

Geospatial Sciences and Geoinformatics– Geographic Information Systems/Remote Sensing/UAVs/Data Science

Natural Resources Exploration– Energy/Minerals/Engineering Geology

Solid-Earth Processes and Dynamics– Petrology/Geochemistry/Volcanology/Structural Geology/Tectonics/Geophysics

Geoscience Education and STEM Education- Geocognition/Climate and Geoscience Communication/STEM Education.

Impact:

This research in the department is often linked to outreach and service activities supporting the Auburn land-grant mission and results in dissemination of new knowledge to the state, nation, and international communities. The department is further dedicated to outreach and service activities through technological links to agencies, professional societies, publishing houses, industry, and other educational institutions. In fall 2024, the department unveiled plans for Geo Explorer Auburn mobile labs. This 36-foot mobile science lab will support education and outreach opportunities for K-12 students, families, and community groups. The vehicle is expected to be completed in late Spring 2025. Once on the road, the world's largest geosciences-themed mobile lab will provide science and technology learning experiences in a "science on wheels" program. STEM education researchers in the department will also collect, analyze, and disseminate learning and engagement data related to the mobile lab experience to inform the STEM education literature.

Teaching:

The Geology program covers traditional field, petrologic, and petrographic instruction as well as emerging areas in geochemistry, geophysics, and environmental geology. The Geography and Environmental Studies program covers the breadth of Geography from human to physical as well as the mapping and spatial (Geographic Information Systems [GIS] and Remote Sensing) sciences. Though united in our focus on the Earth, Environment, and Society, the disciplines of Geology and Geography are very broad fields, and the expertise of our faculty spans a wide range of the natural and social sciences, bridging them perhaps better than any other unit at Auburn University. department includes several active research and teaching themes demonstrating the breadth and depth of the Geosciences.

Future Ambitions:

- Transition into the new STEM+AG building (expected to open in fall 2026) to house all Geosciences personnel, students, and facilities.
- Hire more faculty in strategic areas of research and teaching.
- Enhance extramural funding to support research and outreach efforts of faculty, students, staff, and community partners.
- Develop a new interdisciplinary center of excellence at Auburn focused on Earth Systems Science.
- Grow enrollments in current Geology and Geography/Environmental Studies undergraduate majors, while creating additional new majors.



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Mathematics & Statistics Summary

Mission:

DMS is committed to providing high-quality education, transformative research, and impactful outreach in mathematics and statistics. The department plays a central role in Auburn University by offering instruction to nearly every Auburn student, supporting STEM disciplines, and advancing mathematical and statistical knowledge. Its educational objectives include providing foundational courses for all majors requiring quantitative skills, training future educators and researchers, and fostering public engagement in mathematics and statistics. The department aims to expand knowledge by developing new methodologies and addressing complex problems across various disciplines. Through its outreach programs, DMS seeks to enhance participation in STEM fields, broaden access, and inspire the next generation of mathematicians and statisticians.

DMS currently has 52 full-time faculty, 10 postdoctoral fellows, 4 full-time staff members, and 4 adjunct instructors. The student body includes 122 graduate and 131 undergraduate majors. The department offers four undergraduate majors: Applied Mathematics, Actuarial Science, Applied Discrete Mathematics (soon transitioning to Data Science), and Mathematics. Graduate programs include MS degrees in Mathematics, Applied Mathematics, Statistics, and Data Science, along with PhD programs in Mathematics and the upcoming PhD in Statistics and Data Science.

Research:

DMS has a strong and diverse research profile, with faculty, postdoctoral fellows, and students working in areas such as algebra, algebraic geometry, applied and computational mathematics, combinatorics, analysis, stochastic analysis, geometry, topology, statistics, and data science. The department secures over $2 million in external research funding annually and maintains a high NSF HERD and US News rankings. Faculty members have received prestigious awards, including NSF CAREER Awards, Fulbright Fellowships, AMS Fellowships, and various other research awards.

The department's commitment to research is reflected in its active seminar culture, hosting about 180 visitors annually, its leadership in professional societies, and its organization of national and international conferences. DMS faculty also engage in interdisciplinary research with every AU college, reflecting the department's role in Auburn's R1 research mission.

Impact:

DMS has a broad impact through education, research, and outreach. Faculty hold prestigious professorships, including the Alumni, Knowles, Logan, and RKB professorships, recognizing their excellence in research and teaching. The department's outreach efforts include hosting math competitions for high school and middle school students, the Summer Science Institute, and STEM programs such as Destination STEM and Math Bootcamp for Student Veterans. Faculty also support K-12 teacher training through NSF-funded programs like Dream-Math.

DMS faculty continue to increase its national and international visibility by organizing invited sessions at AMS meetings, serving as journal editors, and engaging in major interdisciplinary research collaborations. Outreach efforts extend beyond Auburn, with engagement in global research partnerships.

Teaching:

DMS provides a high-quality education at all levels, generating the largest student credit hours (SCH) at Auburn University and playing a key role in general education. It employs innovative instructional strategies, including the ALEKS math placement system, a distributed Math Tutoring Center with about 2,000 visits per semester, and Gradescope for equitable assessment. Faculty, postdocs, and GTAs are certified in active learning through the EASL program, and the department's NSF IUSE-supported GTA training program serves as a national model.

DMS offers a well-established actuarial science program and a rapidly growing data science program with an industry capstone experience. The PhD program in Statistics and Data Science, currently under review, is expected to be the first of its kind in Alabama. Interdisciplinary courses and curriculum enhancements ensure students are prepared for careers in academia, industry, and government.

Future Ambitions:

DMS prioritizes growth and innovation in research, teaching, and outreach. Key goals include:

- Hiring in interdisciplinary areas, growing the postdoctoral program, and securing funding for named professorships and a named postdoctoral program.
- Expanding the Data Science program and launching a Data Science Innovations Center.
- Supporting grant efforts, mentoring postdocs, and expanding professional development.
- Strengthening academic support and refining placement and curriculum strategies.



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Physics Summary

Mission:

The Auburn University Department of Physics strives to lead the University in all aspects of its academic mission – teaching, research, service, and outreach – and to leverage that leadership into raising the Department's national and international standing through the careful stewardship of its people, facilities, and resources.

Research:

The Physics Department faculty consists of 23 tenure-track faculty, 5 research faculty, and 3 lecturers. Searches are currently underway for 2 additional tenure-track faculty and one lecturer. The Department currently employs 16 postdoctoral scholars and 2 principal research scientists. The Department is supported by 4 office staff, one Director of Instructional Facilities, and 5 technical support staff. There are currently approximately 140 Physics students split roughly evenly between graduate students and undergraduate majors.

The Physics Department research enterprise is organized across six focus areas:

Plasma Physics: Areas of study include fundamental plasma physics, dusty/complex plasmas, plasma wave creation/propagation and fusion-related plasmas.

Space Physics: Areas of study include magnetospheric physics, solar wind and space weather.

Condensed Matter Physics: Areas of study include wide band gap semiconductors, thin films, thermal diffusion and topological insulators.

Atomic and Molecular Physics: Areas of study include fundamental atomic spectroscopy for astrophysical and plasma applications, cometary atmospheres, ultrafast/attosecond physics, and fundamental atomic/molecular interactions.

Discipline based education research, scholarship of teaching and learning, and instruction: This group is focused on improved student learning at all levels of instruction, including non-majors as well as physics undergraduate and graduate courses.

Biophysics: Areas of study include molecular dynamics through in-silica virtual experiments, vesicle tracking in neurons for physics of cognition, and atomic force microscopy for measuring fundamental protein and other macromolecule dynamics.

Impact:

Below are some highlights of recent advancements and accomplishments within the Department:

- **Extramural Funding:** In the most recent fiscal year, the Department received ~$9M in extramural funding. Physics is a leader across the entire University in extramural funding per faculty member.

Infrastructure Improvements:

- Leach Science Center (LSC) Physics Building (2019) provides small classroom and office space for the majority of faculty, staff, and students
- Astronomy Terrace (2019) provides state-of-the-art telescope facilities for teaching, research, and outreach.
- Theory Laboratory Suite (2022) provides research space for postdoctoral scholars and graduate students in the areas of AMO Physics, Space Physics, Biophysics, and Physics Education Research (funded entirely through indirect cost returns on research grants)
- Renovation of Experimental Support Offices (2021) (funded through indirect cost returns on research grants) LSC Basement Experimental Laboratories (2020-2024) for AMO, Condensed Matter and Biophysics Research

Teaching:

The Department of Physics teaches at three distinct levels with faculty that have won multiple instructional awards. These include:

- Physics for non-physics majors including Physics I and II for Engineers, Physics I and II for pre-health majors, Physics for Aviators, and Introductory Astronomy

- Physics for undergraduate physics majors, including all major subject areas in addition to special topics courses such as physics of music and astrobiology.

- Physics graduate courses including all major subject areas and course sequences specifically designed for graduate students pursuing degrees and careers in our core research areas.

Future Ambitions:

The Department of Physics at Auburn University continues to grow and flourish through increasing student enrollment, increasing extramural funding and scholarship recognized around the world. This growth will continue as we develop partnerships to collaborate in research and teaching, to recruit outstanding graduate students, and find opportunities for our faculty to continue broad world-wide engagement.



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