Research Guide
College of Science
UAH

Atmospheric and Earth Science

Department Chair: Lawrence Carey, Ph.D.
Contact: aes-chair@uah.edu
Location of Departmental Main Office:
Robert "Bud" Cramer Research Hall
320 Sparkman Dr NW
Huntsville, AL 35805

Research areas:

- Atmospheric Chemistry & Air Quality (Christopher, Lee, Newchurch)
- Climate (Christy, Hu)
- Cloud and Storm Processes (Carey, Freeman, Mecikalski)
- Geospatial Informatics and Remote Sensing (Christopher, Griffin, Hu, Nair)
- Human-Ecosystem Dynamics (Hu, Nair, Griffin)
- Hurricanes & Tropical Weather (Mecikalski, Chen)
- Meteorology (Han, Freeman)
- Numerical Modeling (Mecikalski, Nair, Freeman)
- Satellite cloud climatology (Christopher, Han)
- Severe Weather & Lightning (Bitzer, Carey, Freeman)

Biological Sciences

Department Chair (Interim)**:** Jerome Baudry, Ph.D.
Contact: biology.chair@uah.edu
Location of Departmental Main Office:
Shelby Center for Science and Technology
301 Sparkman Dr NW
Huntsville, AL 35899

Research areas:

- Animal behavior (Culumber)
- Antibiotic resistance (Sysoeva)
- Anticipatory mechanisms (Deans)

- Biodiversity discovery, monitoring, and conservation (Niemiller)
- AI in biology (Baudry)
- AI in drug discovery (Baudry)
- Cardiovascular biology (Lawan)
- Computational biology (Baudry)
- Confocal microscopy (Kraemer)
- Diabetes (Lawan)
- DNA transport (Sysoeva)
- Drug discovery (Baudry)
- Drug-resistant uropathogenic bacteria (Sysoeva)
- Ecology (Culumber)
- Food as an environmental signal (Deans)
- Gene expression regulation (Cruz Vera)
- Gut-liver axis connection in the development of fatty liver disease (Lawan)
- Hepatic physiology and disease (Lawan)
- Horizontal gene transfer (Sysoeva)
- Macromolecular crystallization and crystallography (Ng)
- Metabolic and cardiovascular diseases (Lawan)
- Microbiology (Cruz Vera)
- MKP/MAPK substrates in lipid metabolism (Lawan)
- Molecular biology (Cruz Veram Kraemer)
- Molecular biophysics (Baudry)
- Molecular modeling (Baudry)
- Natural transformation (Sysoeva)
- Neurodegenerative diseases (Kraemer)
- Neuronal cell culture (Kraemer)
- Neurotrophin signaling (Kraemer)
- Nutrition and stress interactions (Deans)
- Obesity (Lawan)
- Oxidative stress (Kraemer)
- Pharmaceuticals (Baudry)
- Plasmic conjugation (Sysoeva)
- Physiology (Culumber)
- Plasmid Host Interactions (Magnuson)
- Population ecology and life history (Niemiller)
- Protein engineering (Ng)
- Protein synthesis (Cruz Vera)
- Quantification of neurite degeneration in 2d culture systems (Kraemer)
- Quantification of protein and RNA abundance and localization (Kraemer)
- Regulation of lipid metabolism by MKPs in physiology and disease (Lawan)
- Signal transduction (Lawan)
- Spatial ecology (Niemiller)
- Speciation and biogeography (Niemiller)
- Stereotaxic surgeries involving rodents (Kraemer)

- Structural biology and genomics (Ng)
- Translation & gene expression regulation (Cruz Vera)

Chemistry

Department Chair: Bernhard Vogler, Ph.D.
Contact: chemchair@uah.edu
Location of Departmental Main Office:
Materials Science Building, UAH
301 Sparkman Dr NW
Huntsville, AL 35899

Research areas:

- Adhesion promoters (Weimer)
- Analytical Organic Chemistry (Vogler)
- Beta cells (Love-Rutledge)
- Biochemistry (Love-Rutledge)
- Biodegradable polymers (Scholz)
- Biomarkers (Love-Rutledge)
- Biomedically relevant polymers (Scholz)
- Chemical Biology (Ogungbe)
- Critical Phenomena (Baird)
- Diabetes (Love-Rutledge)
- Drug Discovery (Ogungbe, Vogler)
- Drug target identification (Ogungbe)
- Homogeneous catalysis (Nachtigall)
- Insulin Resistance (Love-Rutledge)
- Lipids (Love-Rutledge, Ogungbe)
- Materials science (Baird)
- Metal/metal oxide nanoparticles (Ling)
- Metal-organic frameworks (Ling)
- NMR spectroscopy (Vogler)
- Noncentrosymmetric compounds (Ling)
- Physical chemistry (Baird)
- Polymeric peptide mimics (Scholz)
- Polymer synthesis - Living polymerization (Scholz)
- Protein crystal growth (Baird)
- Proteomics (Ogungbe)
- Rare Earth Chemistry (Nachtigall)
- Self-assembled polymeric structures (Scholz)
- Separation Science (Nachtigall)
- Structure Elucidation (Vogler)
- Surface science & technology (Weimer)
- Synthetic chemistry (Nachtigall)
- Uranium nanoclusters (Ling)

Computer Science

Department Chair: Letha Etzkorn, Ph.D.
Contact: cschair@uah.edu
Location of Departmental Main Office:
Olin B. King Technology Hall
320 Sparkman Dr NW
Huntsville, AL 35899

Research areas:

- Algorithms and Numerical Methods (Booth, Mukherjee, Zhang)
- Artificial Intelligence and Data Science (Banerjee, Graves, Hauenstein, Menon, Mukherjee, Newman, Zhang)
- Cloud Computing and Security (Etzkorn)
- Computational Biology (Banerjee, Menon)
- Computer Graphics (Hauenstein, Newman)
- Computer Vision (Newman)
- Cybersecurity and Privacy (Banerjee, Brizendine, Chen, Etzkorn, Graves, Menon, Mukherjee, Zhu)
- Deep Learning (Banerjee, Menon, Zhang)
- Distributed Technologies and Middleware (Booth, Etzkorn, Mukherjee, Zhu)
- Explainable AI (Menon, Zhang)
- Gaming and Entertainment Computing (Chung, Hauenstein, Newman)
- High Performance Computing and Networking (Booth, Newman, Zhu)
- Human Computer Interaction (Chung)
- Image Processing (Banerjee, Hauenstein, Menon, Newman)
- Knowledge Representation and Ontology Analysis (Etzkorn)
- Learning based System Analysis and Management (Chen)
- Machine Learning (Banerjee, Hauenstein, Menon, Mukherjee, Zhang)
- Offensive security (Brizendine)
- Pervasive Computing (Zhu)
- Quantum Computing (Booth, Mukherjee)
- Reverse engineering (Brizendine, Etzkorn)
- Software Engineering (Chen, Etzkorn)
- Software Reusability (Etzkorn)
- Software Metrics (Etzkorn, Newman)
- Software Reliability, Program Verification and Automatic Repair (Chen)
- Visualization and Graphics (Chung, Newman)

Mathematical Sciences

Department Chair: Toka Diagana, Ph.D.
Contact: mathchair@uah.edu
Location of Departmental Main Office:
Shelby Center for Science and Technology
301 Sparkman Dr NW
Huntsville, AL 35899

Research areas:

- Algorithms (Roy, Ravindran, Zhang)
- Bioinformatics (Roy)
- Coding Theory (Bossaller, Zhang)
- Combinatorics (Zhang)
- Control Theory (Atkins, Ravindran)
- Cryptography (Bossaller, Steinwandt, Zhang)
- Deep Learning (Ravindran)
- Differential/Difference Equations (Ai, Atkins, Diagana, Miller)
- Discrete Math (Zhang)
- Dynamical Systems (Ai, Diagana)
- Epidemiology (Ai, Atkins, Roy)
- Fluid Dynamics (Miller, Ravindran)
- Fluid Flow Control (Ravindran)
- Genomics (Roy)
- Graph Theory (Zhang)
- Group Theory (Bossaller)
- High Accuracy Finite Element Analysis (Ravindran, Wu)
- Integrodifferential Equations (Diagana)
- Internet of Things (Roy)
- Machine & Statistical Learning (Roy)
- Mathematical Biology (Ai, Atkins)
- Mathematical Logic (Zhang)
- Network theory (Roy)
- Numerical Analysis (Atkins, Ravindran)
- Operator Theory (Diagana)
- Partial Differential Equations (Diagana, Miller, Ravindran)
- P-adic Analysis (Diagana)
- Random fractals (Wu)
- Reduced Order Modeling (Ravindran)
- Statistical Properties of Gaussian Random fields (Wu)
- Stochastic Differential/Partial Differential Equations (Diagana, Wu)
- Stochastic Processes and Random Fields (Wu)

Physics and Astronomy

Department Chair: James Miller, Ph.D.
Contact: phchair@uah.edu
Location of Departmental Main Office:
Optics Building, Room 201
301 Sparkman Dr NW
Huntsville, AL 35899

Research areas:

- Atmospheric Physics (Chronis, Pushpawela)
- Biophotonics and Biophysics (Le)
- Computational Physics (Miller)
- Fast Radio Bursts (Lieu)
- Fiber Optics and Optical Sensing (Duan)
- Galaxies, Galaxy Groups and Clusters, Cosmology (Chakrabarti, Hakkila, Lieu, Sun, Walker)
- High-Energy Solar Physics (Miller)
- Laser Atmospheric Propagation (Gregory)
- Nanophotonics and Quantum Devices (Sadeghi)
- Quantum Entanglement and Quantum Communications (Davidson, Gregory)
- Radio Astronomy (Lieu)
- Statistics and Data Science (Bonamente, Hakkila)
- Ultrafast and Precision Optics (Duan)
- X-Ray Astronomy (Bonamente, Sun, Walker)

Space Science

Department Chair (Interim): Vladimir Florinski, Ph.D.
Contact: spachair@uah.edu
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Robert "Bud" Cramer Research Hall
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Huntsville, AL 35805

Research areas:

- Computational fluid dynamics (Florinski, Pogorelov)
- Cosmic rays (Florinski, le Roux, Zank)
- Gamma-ray bursts (Veres)
- Gravitational waves (Veres)

- Heliospheric space plasma physics (Che, Florinski, Hu, le Roux, Zank)
- Local interstellar medium (Florinski, Pogorelov, Zank)
- Outer atmosphere of the Sun (Hu, Panchapakesan, Zank, Zhao)
- Solar wind (Adhikari, Hu, le Roux, Pogorelov, Zank, Zhao)
- Space weather (Hu, Pogorelov)
- Turbulent plasma (Adhikari, Che, Hu, le Roux, Zank, Zhao)
- X-ray instrumentation (Panchapakesan)