

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 Vera](#) [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: Huaming Zhang, Ph.D. (Interim)

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](#))
- Computational Biology (Banerjee, [Menon](#))
- Computer Graphics ([Hauenstein](#), [Newman](#))
- Computer Vision ([Newman](#))
- Cybersecurity and Privacy (Banerjee, Brizendine, Chen, [Graves](#), [Menon](#), [Mukherjee](#), [Zhu](#))
- Deep Learning (Banerjee, [Menon](#), [Zhang](#))
- Distributed Technologies and Middleware ([Booth](#), [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](#))
- 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)
- Software Engineering (Chen)
- Software Metrics ([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

Location of Departmental Main Office:

Robert "Bud" Cramer Research Hall

320 Sparkman Dr NW

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](#))