## Research Advisors and Research Topics

### Anatomy Department

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<thead>
<tr>
<th>FACULTY MEMBER</th>
<th>POTENTIAL RESEARCH TOPICS</th>
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| Peter Kondrashov, Ph.D. <br>p kondrashov@atsu.edu<br>660-626-2771 | • Musculoskeletal adaptations to various modes of locomotion  
• Microstructure of bone using scanning electron microscopy  
• Histology of the knee joint and mechanisms of pain generation in the knee.  
• Role of inflammation in the histology of bone and articular cartilage  
• Evolution of the mammalian knee joint as a mean for understanding knee pain  
• Early evolution and adaptations of mammals |
| Solomon Segal, M.D. <br>solomonseagal@atsu.edu<br>660-626-2753 | • Clinically-oriented anatomy and neuroanatomy  
• Neuroimaging  
• Mechanisms of neural plasticity and regeneration  
• Visualization and spatial organization of white matter fibers  
• Segmental organization of the spinal cord |
| Bruce A. Young, Ph.D. <br>bbyoung@atsu.edu<br>660-626-2491 | • Biomechanics of the vertebral column  
• Biophysics and neurophysiology of sensory systems  
• Functional morphology and biophysics of venom expulsion |

### Biochemistry Department

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| Zulfiqar Ahmad, Ph.D. <br>zahmad@atsu.edu<br>660-626-2144 | • Role of ATP synthase in human health and diseases  
  o ATP synthase: a molecular therapeutic drug target for cancer  
    and microbial infections  
  o ATP synthase: a base model for the development of nanomotors in nanomedicine usage |
| James Cox, Ph.D. <br>jccox@atsu.edu<br>660-626-2466 | • Gene studies in cancer  
• Proteases in tumor metastasis |
| Pandurangan Ramaraj, Ph.D <br>pramaraj@atsu.edu<br>660-626-2338 | • Effect of sex steroids on cancer cell growth and functions using melanoma (cancer) cell as a model system  
• To elucidate signaling pathways involved in steroid hormones action |
## Microbiology and Immunology Department

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| Neal Chamberlain, Ph.D. | - Mechanisms of pathogenicity of Staphylococcus aureus and S. epidermidis  
                        - Mechanisms of antibiotic survival of S. epidermidis in biofilms  
                        - Identification of novel S. aureus gene targets for therapy |
| Priscilla Phillips, Ph.D. | - Characterize select regulatory, small, non-coding RNAs (sRNA) of \textit{Porphyromonas gingivalis} and investigate its role in pathogenesis  
                        - Determine the expression of \textit{Porphyromonas gingivalis} sRNA in infected tissue from select sites of infected rats and determine if there is any correlation to health and disease  
                        - Investigate key virulence factors of \textit{Porphyromonas gingivalis} with a focus on intracellular trafficking, bacterial cell fate, multispecies biofilm development, and host cell-type specific host-pathogen interactions  
                        - Generate comparative \textit{in silico} analyses of sRNA expression profiles of pathogenic and non-pathogenic strains of \textit{Porphyromonas gingivalis}  
                        - Determine the antimicrobial efficacy of novel agents used in wound healing and its impact on biofilm development and dispersal of common wound pathogens such as \textit{Pseudomonas aeruginosa} and \textit{Staphylococcus aureus} using an ex-vivo explant model |
| Vineet Singh, Ph.D. | - Mechanisms of pathogenicity of \textit{Staphylococcus aureus}  
                        - Molecular pathogenesis of \textit{S. aureus} infections  
                        - Global gene expression profiling of staphylococci under stress  
                        - Identification of novel \textit{S. aureus} gene targets for therapy |
| Melissa Stuart, Ph.D. | - Production of monoclonal antibodies for use as research tools  
                        - Evaluation of \textit{Trichomonas tenax} as an oral pathogen  
                        - Analysis of the metabolic enzymes of \textit{Trichmonas vaginalis} |
### Pharmacology Department

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| Yingzi Chang, M.D., Ph.D.| - Mechanisms of insulin-enhanced restenosis after angioplasty in type II diabetes  
- Involvement of protein tyrosine phosphatase 1B in insulin-enhanced vascular injury-induced neointima formation  
- Role of MCPIP1 in metabolic homeostasis  |
| Keith Elmslie, Ph.D.     | - Determine the mechanisms controlling excitability of the exercise pressor reflex to better understand how this reflex regulates the cardiovascular systems under physiological and pathophysiological conditions  
- Determine the molecular target(s) of analgesic conopeptides.  
- Understand the molecular determinants of calcium channel gating and permeation.  
- Examine the effects of cell membrane lipids on ion channel gating. |
| Henry Han, Ph.D.         | - Molecular and cellular mechanisms underlying neurovascular dysfunction and cognitive deficit associated with neurological disorders, including Alzheimer’s disease, cerebral amyloid angiopathy, and ischemic stroke and hemorrhagic stroke.  
- Preclinical studies to identify/validate new therapeutic targets for CNS disorders and evaluate the effects of novel drug candidates for the diagnosis and treatment of neurovascular disorders utilizing in vitro as well as in vivo animal models.  
- Effects of new multimodal agents on Aβ aggregation, metal chelation and cellular Aβ uptake/clearance, and their translational potential. |
| David Middlemas, Ph.D.   | - Brain-derived neurotrophic factor (BDNF) activated signaling pathways  
- The role of BDNF and its receptor, TrkB, in the mechanism of drug action  
- The role of neurogenesis in anti-depressant drug action in juveniles |
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| Robert Baer, Ph.D.    | - Mechanisms underlying the anti-metastatic actions of caveolin-1 in melanoma  
| rbaer@atsu.edu        | - Role of chemokine signaling in metastatic behavior of melanoma (migration, invasion, adhesion, proliferation, and apoptosis)  
| 660-626-2322          | - Signaling in vascular and vascular-like network formation (angiogenesis and vasculogenic mimicry) |
| William Brechue, Ph.D.| - Understand the basis of rhythm, asymmetry, and variability of human movement in defining physical function  
| wbrechue@atsu.edu      | - Musculoskeletal and neuromuscular aspects of gait and fatigue  
| 660-626-2309          | - Structure-function relationships of skilled movement  
|                       | - Mechanical and metabolic function in health, aging and disease  
|                       | - Definition of dynamic balance  
|                       | - Relationship between gait mechanics and cognitive function |
| Timothy Geisbuhler, Ph.D. | - Protection of ischemic/anoxic heart by estrogen, phytoestrogens and other natural products.  
| tgeisbuhler@atsu.edu  | - Nucleotide metabolism in ischemic and anoxic heart cells (bioenergetics)  
| 660-626-2315          | - Impact of plant natural products (“botanicals”) on cardiac function and cardiac cell metabolism. |
| Yohei Norimatsu, Ph.D.| - Electrophysiological studies of the CFTR chloride channel  
| ynorimatsu@atsu.edu   | - Structure-function studies with the use of protein mutagenesis and chemical modification  
| 660-626-2328          | - Atomic-scale molecular modeling of CFTR and trace amine-associated receptor 1  
|                       | - Virtual ligand docking, molecular dynamics simulation, rational drug design |
| Tim Ostrowski, Ph.D.  | - Impact of Alzheimer’s Disease (AD) on respiratory parameters and chemoreflex function  
| tostrowski@atsu.edu   | - Neuronal and synaptic properties of brainstem neurons in AD  
| 660-626-2509          | - Morphological alterations of cardiorespiratory centers in AD  
|                       | - ROS/antioxidant balance and its impact on autonomic brain centers in health & disease  
|                       | - Management of oxidative load in AD: Prevention vs. Therapy |
| William Sexton, Ph.D. | - Determinants of oxygen delivery relative to oxygen demand in skeletal muscle, diaphragm and heart with an emphasis on the impact of exercise training, diabetes, aging, and hypertension  
| wsexton@atsu.edu      | - Impact of blood flow impairment on collateral vessel formation in skeletal muscle on oxygen delivery and muscle function in health, diabetes, and exercise training  
| 660-626-2324          | - Role of nitric oxide in the control of oxygen delivery and utilization in contracting skeletal muscle, diaphragm and heart and the impact of disease and aging |