Biomedical Sciences Program

Genetics concentration

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Department of Molecular Genetics and Microbiology
University of Florida, College of Medicine
• **Genetics as a project**
  mutants/variants (natural or created) vs “wild type.” Hypothesis-driven or discovery-based.

• **Genetics as a tool**
  Omics/computational biology, gene editing, gene delivery, complementation/rescue, genetically modified models (animal, microorganism, cells), population/pedigree/patient studies.

Tissue/tumor heterogeneity
Research areas:
Structure/function (genotype-to-phenotype, RNA biology/function)
Disease model systems (prokaryote, eukaryote)
Molecular disease mechanisms (human, microbe, interaction)
Gene therapy
Epigenetics
Stem cell biology
Cancer genetics
Development
Therapeutics
Applications of computational biology

~70 faculty

Publication averages:
1.7 first author
2.7 co-author
Genetics concentration curriculum: **flexibility**

Genetics Journal Club fall semester beginning in 2\textsuperscript{nd} year
- choice of any journal club in the spring.
- senior students may present research instead of paper.

Coursework: **ANY** concentration-approved UF graduate-level course (ask coordinators).

Only need 6 graded credit hours after the first year (can be taken at any time, can include the Genetics Grant Writing course and any graded journal clubs).
- Most students opt for *more* than 6 hours.
- Less if graduate credits are transferred in.

*Annual visit to a biotech company (not this year).*
UF Center for Neurogenetics

Genes and mutation mechanisms in genetic disorders involving peripheral and central nervous system. Preclinical and translational research toward clinical trials of therapies. Cutting-edge technology and bioinformatics. RNA biology in normal cell function and pathology.

DNA-repeat based disorders: myotonic dystrophy, amyotrophic lateral sclerosis, spinocerebellar ataxia, Huntington, etc.

Dr. Laura Ranum, Director
Dr. Maury Swanson
Dr. Eric Wang
Dr. Kitaro Fujii

And other affiliated faculty
UF is a leader in AAV development and use in biomedical research including gene therapy

Powell Gene Therapy Center (Director Dr. Barry Byrne).

2019: UF over 40 PubMed AAV publications

>30 BMS faculty - keyword search “AAV” or “gene therapy”

UF has >4000 patents/patent applications, hundreds involve AAV. Many include graduate students who worked on those projects.

Targets for gene therapy at UF: retinal diseases (including FDA approved), alpha-1-antitrypsin deficiency, cancer, Parkinson’s, cardiovascular disease, hemophilia, sickle cell anemia, neuromuscular diseases, diabetes, sepsis.
3 Genetics graduates are board-certified by the American College of Medical Genetics and Genomics, and direct or co-direct cytogenetics and/or molecular diagnostics laboratories.

Lee Kaplan, PhD, FACMG
Astellas Inst. of Regenerative Medicine

Christin Collins, PhD, FACMG
Emory University

John J. Alexander, PhD, FACMG
Emory University
Recent graduates – where are they?

Postdoctoral fellows

Biotechnology/Pharmaceutical

OVERALL: 65% academia (including postdoc), 23% biotech/pharma, 12% other (federal agencies, private institutes, nonprofits)
• faculty can associate with >1 concentration
• interdisciplinary research projects and Supervisory Committees
• travel funds for scientific meetings (BMS and UF)
• pay bonus for extramural fellowships (NIH, AHA, other)
• Experience mentoring excellent undergraduate students in lab
• opportunities for honors & awards in BMS and UF overall – science, leadership, service (including international students)
• Network: classmates first year, plus concentration after that.
• Focus on research after first year.
• PhD Candidacy Qualifying Exam (end yr 2 - early yr 3): written proposal on your own research, oral defense with your committee (no public presentation, no written exams).
• Grant-writing classes.
• Mentor(s), committee members, BMS office, concentration directors, graduate secretaries all available for guidance.
• fast-track option (on rotation 1 or 2, if you and mentor agree).
• ~90% PhD graduation rate.
Career development support

• UF Health Science Center student/postdoc career development: GradDev.ufhealth.org
  – NIH training grants (HSC) - support for >50 predoctoral students.
  – Leadership training opportunities
  – Information about alternative career paths
  – Information about developing Professional skills

• BMS Career Development Seminar (4-8/year)
  – Academia, biotechnology/pharmaceutical, science law, nonprofit medical foundations, science writing/editorial, grants/business administration, etc.
  – Networking

• Additional training and Certificates (most online, may build on courses commonly taken).
  http://graduateschool.ufl.edu/academics/graduate-certificates/
  – Clinical and Translational science
  – Cancer Biology, Epidemiology, Outcomes, Fed. Policy Internship
  – Teaching
  – Nonprofit leadership
  – Business
The End

Questions?