• faculty can be associated with >1 concentration (flexible)
• interdisciplinary research projects and Supervisory Committees
• travel funds for meetings (BMS and UF)
• pay bonus for extramural fellowships (NIH, AHA, other)
• mentoring undergraduate students in lab
• opportunities for honors & awards in BMS and UF overall – science, leadership, service (including international students)
• get to know classmates first year, then in concentration
• first year – courses, rotations, join lab. Then mostly research.
• 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, committee members, concentration directors, graduate secretaries all help with guidance and requirements.
• Independent Development Plan: self-evaluation, planning for future.
• fast-track option (rotation 1 or 2, if you and mentor agree).
• ~90% PhD graduation rate.
Career development

• 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, nonprofit medical foundations, science writing/editorial, grants/business administration, science law, etc.
  – Networking

• Extra training and Certificates (mostly online, some build on courses commonly taken).
  http://graduateschool.ufl.edu/academics/graduate-certificates/
  – Clinical and Translational science certificate
  – Cancer Biology, Epidemiology, Outcomes, Fed. Policy Internship
  – teaching
  – nonprofit leadership
  – business
Clinical and Translational Research: TL1 Fellowship

TL1 program - Team-Based (PhD students from different UF programs). 2 years of stipend, = 2\textsuperscript{nd} concentration on transcript (clin. research courses). Does not add any time to graduation. BMS – usually 3rd and 4\textsuperscript{th} years.

Example: Gopinath (BMS neuroscience) + Farhadi (Biomedical engineering):

\textit{CNS-localized delivery of neurotrophic factors for treatment of Parkinson’s disease}

Created a modified glial cell-derived neurotrophic factor molecule for a Parkinson’s disease therapy - inject into affected parts of the brain to protect and rescue dopaminergic neurons. Modified factor is retained longer in brain tissues, better efficacy.

- Ave. 1.7 first-author publications
- Ave. 2.7 co-authored publications.

Positions:
- 65% academia (including postdoc)
- 20% biotech/pharma
- 15% other (federal agencies, nonprofit, law, etc)

Funded by fellowships/training grants: 10-50% each year

Genetics affiliated faculty: 67 (17 departments, 3 colleges)
Genetics concentration: flexibility

Genetics Journal Club each fall semester beginning in 2nd year, with choice of any journal club in the spring. Senior students may present their research instead of a paper.

Coursework can be ANY concentration-approved (ask directors) UF graduate-level course. Includes courses not on usual BMS listing.

Only need 6 graded credit hours after the first year (at any time, includes Genetics Grant Writing course and graded journal clubs).

Most students opt for more than 6 hours.
May be reduced if graduate credits are transferred.
2019-20: 13 Genetics students (10 faculty, 5 departments)
• **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 and delivery,
  complementation/rescue, genetically modified models
  (animal, microorganism, cells), population/pedigree studies.
Research areas:
structure/function (phenotype/genotype)
disease model systems (prokaryote, eukaryote)
molecular disease mechanisms
gene therapy
epigenetics
stem cell biology
cancer genetics
development

Key word cloud from Genetics dissertation titles
Genetics-affiliated faculty interested in students (some pending funding)

- Cohn: genetics of development
- Bryant: mechanisms in chronic lung disease
- McIntyre: statistical genetics, analysis of big data
- Pacak: mitochondrial disease pathogenesis, stem cells, therapies
- Ranum, E. Wang, Swanson: mechanisms of neurogenetic diseases
- Wu: genetics/signaling in cancers
- Zhou: epigenetics & apoptosis in immunity and cancer
- Scott: hematopoietic system in wound healing, regeneration
- Renne: Kaposi’s sarcoma herpesvirus miRNA
- L. Bloom: DNA replication and repair
- Zolotukhin: AAV vector development, gene therapy
- Karst: norovirus pathogenesis
- Ash: mechanisms of retinal diseases, therapeutics
- Kopinke: muscle cell biology and response to injury
- Makki: genetics of complex traits involving connective tissue
- Schweizer: pathogenic bacteria and drug resistance
- Foster: mechanisms in brain aging
- G. Wang: HIV/HCV drug resistance, gut microbiome
- Toth: epigenetics of herpesviruses’ latency and lytic cycles
- Maurelli: viral pathogenesis in sexually transmitted disease
- Kang: molecular genetics of muscular dystrophies
- Bhaduri-McIntosh: EBV in cancer pathogenesis
- Whitney lab: CNS in marine organisms - development, stem cell biol
UF Center for Neurogenetics

Genes/mutation mechanisms in genetic disorders of peripheral and central nervous system; preclinical and translational research toward therapies, some of which may apply to non-genetic neurodegenerative disorders.

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

Dr. Laura Ranum, director

Dr. Maury Swanson

And affiliated faculty, + new faculty being recruited now.

Dr. Ranum discovered RAN translation (non-ATG proteins translated from DNA repeat expansions); her recent data suggests that antibodies to these pathogenic proteins may be an effective therapy.
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

36 BMS faculty “AAV” or “gene therapy”

UF has 4346 patents/patent applications, hundreds involve AAV. Recent example: “AAVRH.10 VARIANTS WITH HOST ANTIBODY ESCAPE CAPABILITIES AND ALTERED TISSUE TARGETING PROPERTIES”

Conditions: retinal diseases, alpha-1-antitrypsin deficiency, cancer, Parkinson’s, cardiovascular disease, hemophilia, neuromuscular diseases
Recent graduates – where are they?

Postdoctoral fellows

Biotechnology/Pharmaceutical

Merck

EMD Serono

Intrinsic Health Solutions

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