AUGUSTA UNIVERSITY
MEDICAL COLLEGE OF GEORGIA

APPLIED MOLECULAR EPIDEMIOLOGY

Summer Internship

Department of Pathology

WHAT IS EPIDEMIOLOGY?

- It is a branch of science that studies how diseases spread, who gets them, and why
- Helps scientists and public health officials understand, prevent, and control diseases
- Epidemiologists, often called "disease detectives"
  - Investigate disease outbreaks
  - Identify patterns and risk factors
  - Use data to find causes and solutions for preventing diseases
- Importance
  - Helps stop the spread of diseases
  - Protects public health
  - Improves the wellbeing of communities
- **Molecular Epidemiology, a branch of epidemiology**
  - Uses molecular biology to better understand how genetic sequences result in occurrence and spread of diseases
  - Uses molecular biology tools: DNA sequencing, gene expression analysis, and other laboratory techniques to identify causative factors of the disease

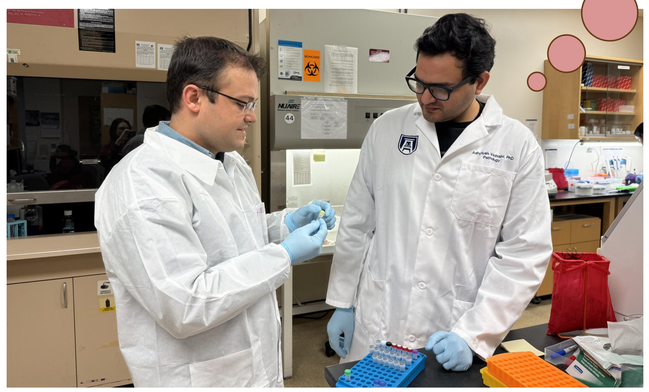
WHAT IS MICROBIOLOGY?

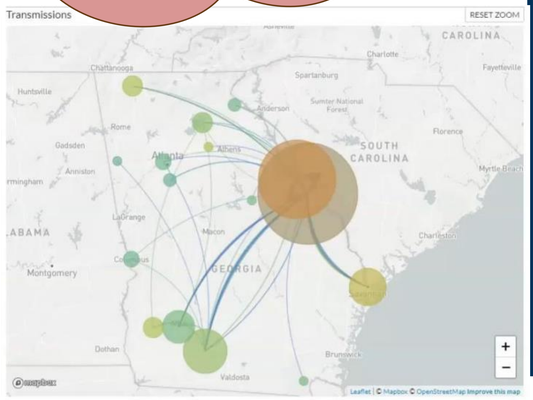
- It is a branch of science that studies microorganisms (tiny living things), such as bacteria, viruses, fungi, and parasites, that are too small to be seen with the naked eye
- Harmful microorganisms (pathogens) invade the body and cause **infectious diseases**
- By studying **microbiology**, we can fight **infectious diseases** and improve **public health** through vaccines, medications, and a better understanding of how these tiny organisms operate

WHAT IS BIOINFORMATICS?

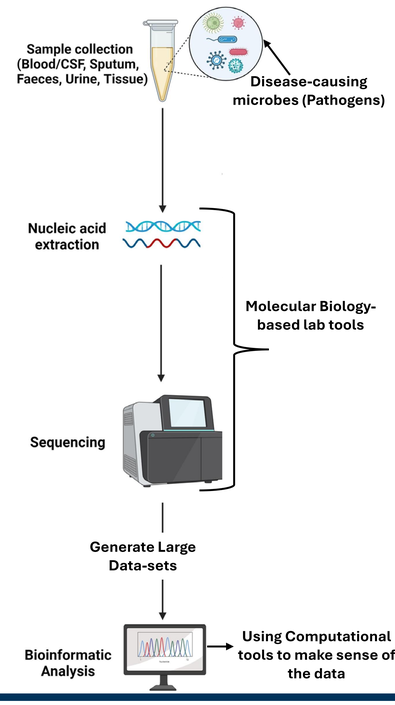
- It is a branch of science that combines computational programs to study biology
- Involves the use of computational tools to manage, analyze, and model large sets of biological information, such as DNA sequences
- Scientists have developed these tools to help track the origins and spread of new disease-causing microbes, predict future outbreaks, and develop vaccines

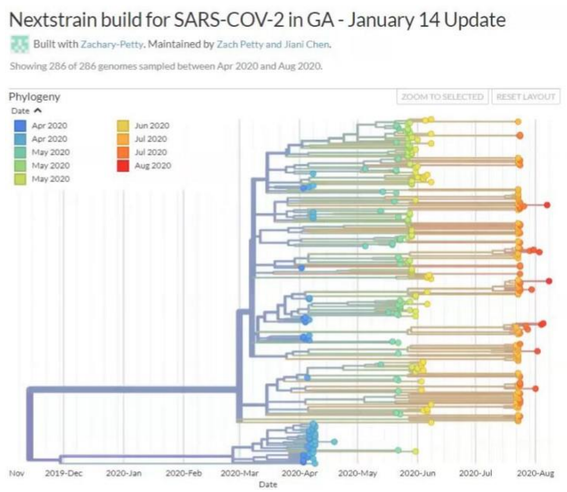
Do you have what it takes to be a disease detective?





FROM PATHOGEN SEQUENCING TO PUBLIC HEALTH SURVEILLANCE





- Discover new disease-causing microbes
- Follow the spread of the microbes
- Help develop public policies for the health and safety of the community

KEY POINTS

- 6-week commitment, 20 hours per week
- Learn how a clinical laboratory works during an infectious disease outbreak
- Follow along the COVID-19 workflow: testing samples, reporting results, identifying new variants, and tracking the spread of the disease.
- Enjoy lectures and hands-on training on laboratory techniques and data visualization toolkits
- Student-led presentations
- Lectures include introduction to microbiology, molecular biology, and epidemiology
- 2-week bioinformatics deep-dive for large DNA data set analyses
- Career exploration and opportunities to meet experts in the fields of molecular epidemiology, laboratory science, and bioinformatics
- A program stipend will be given completion

HOW TO APPLY

- **Must be 16 years old by program start**
- The application is open October - January
- There are limited spots available and students will be accepted on a first come, first serve basis

FUNDING

CDC Pathogen Genomics Centers of Excellence