

## STEM Careers: Many different types of labs and work experiences

Many people don't realize the wide array of career opportunities available to those who major in the sciences. Students considering careers in science might think of doctors, engineers or teachers, but many other avenues for career opportunities also exist.

### Various workplaces

People with degrees in science can be found working in many different work environments, including, but not limited to:

- Hospitals
- Universities
- Schools
- Companies that make products such as food, make-ups, lotions, perfumes, environmental or agricultural products, or other consumer products
- Companies selling science-related products and equipment
- Pharmaceutical companies
- Environmental testing companies
- Government
- Science media companies, such as those that make films, text books or other science-based communications
- Zoos and aquariums
- Museums

As you can probably tell, not all of these jobs take place in labs. Some scientists do not work in labs at all, and for others, their "lab" probably does not seem like a lab. For example, scientists working in zoos or aquariums often work with the animals and interact with the public. Likewise, someone working at a science-media company may be talking with scientists and creating images or writing text that explains science.

### Types of labs

Even when working in a lab, scientific jobs can be very different. For example, at the Children's Hospital of Philadelphia (CHOP), three different kinds of labs employ thousands of people:

- **Clinical Labs** — The majority of work in clinical labs supports patient care. A variety of different labs each exist within these categories.
- **Research Labs** — Research labs focus on a question or series of questions related to a specific topic or area of interest.
- **Core Labs** — While some of the work in core labs may be dedicated to new research, much of it supports the research of others using a specific type of assay or in an area of expertise.

## Clinical labs

Examples of clinical labs include:

- **Anatomic pathology** — Pathologists in this lab aid in diagnosis through histology, histochemistry and microscopic examination of tissue samples obtained through surgery or autopsy.
- **Blood bank** — Personnel in this lab specialize in delivery of and appropriate treatment with blood and blood products.
- **Chemistry** — People in this lab perform tests ordered for patient care and diagnosis, including blood gases, toxicology screenings, and testing for glucose, general chemistry (lipids, proteins, enzymes, electrolytes), and drugs.
- **Hematology** — People in this lab test patient blood and body fluids, like blood counts, urinalysis, spinal fluid analysis, and pregnancy tests.
- **Microbiology** — People in this lab analyze samples for pathogens, such as bacteria, yeast and molds. In addition, tests that help determine treatment, such as analysis of antibiotic susceptibility testing, are conducted.
- **Immunology** — Personnel in this lab perform assays that aid in identifying and quantifying cell populations related to the generation of an immune response, such as T cells, B cells and natural killer cells. Data from these analyses can be used to identify patients with autoimmune disorders, leukemia or lymphoma, as well as monitor patient responses to transplants.
- **Virology** — Personnel in this lab perform assays on samples from patients who are suspected of having viral infections. Staff use the data to aid physicians with diagnosis and treatment of individual patients as well as to monitor trends in disease rates (for example influenza, RSV and rotavirus).
- **Immunogenetics** — Personnel in this lab perform tests associated with human leukocyte antigen (HLA) typing to increase successful outcomes following transplants and for diagnosis of diseases for which certain HLA types have been identified as being associated with disease.
- **Molecular genetics** — Personnel in this lab perform assays that help with diagnosis and treatment of genetic disorders, such as clotting disorders and cancer predisposition syndromes.
- **Stem cell lab** — Personnel in this lab prepare progenitor cell populations for transplantation, process and store donor samples, and perform assays to enrich sub-populations of cells within the sample prior to transplant.

Visit these links to see examples of clinical labs at Children's Hospital of Philadelphia:

- <https://www.chop.edu/centers-programs/clinical-immunology-laboratory>
- <https://www.chop.edu/services/clinical-genetics>
- <https://www.chop.edu/centers-programs/pathology-and-laboratory-medicine/infectious-disease-diagnostics-laboratory>

## Research labs

Research labs study very different questions. Some labs have large groups of people collaborating to understand an area of science. Some labs are quite small. All research labs collaborate with and learn from other scientists who are doing similar work — whether in their institution or other institutions around the world.

To see what types of research are being conducted at the Children's Hospital of Philadelphia, visit the research institute's website:

<https://www.research.chop.edu/research/overview>.

## Core labs

Examples of core labs include:

- **Biostatistics and data management** — This group helps researchers understand large and/or complex data sets using computer analysis and statistics.
- **Flow cytometry** — This is a method in which researchers sort cells into groups by labeling them with different colored fluorescent labels. Personnel specialize in the use of flow cytometry equipment and analysis software.
- **Lab animal services** — Personnel in this area care for animals being used for research, monitor for proper care and treatment; maintain approved protocols, and ensure appropriate use of animals per protocols. Examples at CHOP include the aquatic zebrafish core and the small animal imaging facility core.
- **Metabolomics** — This group helps researchers who are working to understand the relationship between metabolism and disease. They use systems like mass spectrometry, high-performance liquid chromatography (HPLC), and other assays to assist researchers.
- **Pathology** — Personnel in the pathology lab prepare, stain and examine tissues microscopically, including using various types of microscopes, web-based data applications and 3-D imaging.
- **Proteomics** — Personnel in this lab are expert in techniques related to protein production, characterization and analysis.

To find out more and see other examples of core labs, visit the core lab facilities section of the CHOP website: <https://www.research.chop.edu/our-research/core-facilities>.