Computational Bioscience Program

~ EDUCATION MISSION STATEMENT ~

The Computational Bioscience Program of the University of Colorado School of Medicine is dedicated to training computational biologists who aspire to achieve excellence in research, education and service, and who will apply the skills they learn toward improving human health and deeping our understanding of the living world.

The Computational Bioscience Program provides graduates with the foundation for a lifetime of continual learning. Our curriculum integrates training in computation and biomedical sciences with student research and teaching activities that grow increasingly independent through the course of the program. Our graduates are able to do independent computational bioscience research, to collaborate effectively with other scientists, and to communicate their knowledge clearly to both students and the broader scientific community.

The Computational Bioscience Program is committed to continually reviewing and improving its curriculum as the science and practice of bioinformatics evolves. The following four goals represent the foundation of the computational bioscience graduate education program at the University of Colorado.

~ EDUCATION GOALS AND OBJECTIVES ~

KNOWLEDGE GOALS

Graduates demonstrate their knowledge of core concepts and principles of computational bioscience, and the ability to apply computation to gain insight into significant biomedical problems. This knowledge includes mastery of the fundamentals of biomedicine, statistics and computer science, as well as proficiency in the integration of these fields. Graduates contribute to the discovery and dissemination of new knowledge.

KNOWLEDGE OBJECTIVES

1. Demonstrate knowledge of the scientific principles that underlie the current understanding of molecular biology, statistics and computer science.
2. Demonstrate an ability to productively integrate knowledge from disparate fields to solve problems in biomedicine using computational methods.
3. Demonstrate knowledge of the types and sources of data most commonly used in computational bioscience, including knowledge of all major public data repositories.
4. Demonstrate the knowledge of the classes of algorithms most often applied in computational bioscience, and their domains of applicability.
5. Demonstrate an understanding of the principles and practice of the scientific method as applied in computational bioscience, including experimental design, hypothesis testing, and evaluation of computational systems.

COMMUNICATION SKILLS GOALS

Graduates demonstrate interpersonal, oral and written skills that enable them to interact productively with scientists from both biomedical and computational domains, to clearly communicate the results of their work in appropriate formats, and to teach others computational bioscience skills. Graduates are able to bridge the gap between biomedical and computational cultures.

COMMUNICATION SKILLS OBJECTIVES

1. Communicate effectively, both orally and in writing, in an appropriate range of scientific formats, including in formal presentations, collaborative interactions, and in the critique of others' work.
2. Demonstrate familiarity with both biomedical and computational modes of expression, and be able to communicate clealy across disciplinary boundaries.
3. Demonstrate commitment and skill in teaching to and learning from students, colleagues, and other members of the scientific community.

PROFESSIONAL BEHAVIOR GOALS

Graduates demonstrate the highest standards of professional integrity and exemplary behavior, as reflected by a commitment to the ethical conduct of research, continuous professional development, and thoughtfulness regarding the broader implications of their work.

PROFESSIONAL BEHAVIOR OBJECTIVES

1. Act in an ethically responsible manner, displaying integrity, honesty, and appropriate conduct at all times.
2. Recognize the limits of one's knowledge, skills, and behavior through self-reflection and seek to overcome those limits.
3. Always consider the broad significance of one's professional actions, including their implications for society and the living world.

SELF-DIRECTED AND LIFE-LONG LEARNING SKILLS

Graduates demonstrate habits and skills for self-directed and life-long learning, and recognize that computational bioscience is a rapidly evolving discipline. Our focus is on the development of adaptive, flexible and curious scientists able to comfortably assimilate new ideas and technologies during the course of their professional development.

SELF-DIRECTED AND LIFE-LONG LEARNING SKILLS OBJECTIVES

1. Recognize the need to engage in lifelong learning to stay abreast of new technologies and scientific advances in multiple disciplines.
2. Locate, evaluate and assimlate relevant new knowledge and techniques from a wide variety of sources.