

## PROPOSED PROGRAM SUMMARY

**Institution:** University of Louisville  
**Program Name:** Artificial Intelligence in Medicine  
**Degree Destination:** Master of Science

**CIP Code:** 11.0102

**Credit Hours:** 30

**Implementation Date:** 8/1/2024

### Program Description

The Artificial Intelligence in Medicine program will prepare students to analyze medical care and public health care data. With this degree, students will learn to analyze, present, and use data through computation, modeling and simulation, machine learning, and advanced statistical analysis.

The field of computation, particularly machine learning, has experienced a renewed interest in the past five years with the progress of deep learning and artificial intelligence (AI) technologies. In medicine, AI is envisioned to help clinicians improve diagnoses, prognoses, and treatment by providing efficient, timely, and accurate data analysis. Medical and public health data involve very large and complex data sets. An understanding of computational and modeling tools, such as machine learning, deep learning, data mining, and statistics, is important for development of optimal AI technologies in these fields. AI enables simulations of human intelligence processes by machines, which can be applied to complex medical issues such as genomics, metabolomics, clinical biomarkers, medical imaging data, etc., in a way that goes beyond traditional data analysis approaches.

As a result of this program, graduates will be able to:

- Apply advanced AI knowledge to the fields of medicine and public health through the application of advanced programming and mathematical principles.
- Effectively communicate with colleagues and practitioners in multiple disciplines, such as engineering, statistics, and bioinformatics.
- Develop and hone advanced skills in AI methods and tools used in medicine in a wide variety of employment opportunities, such as industry, academia, and government, or in furthering their graduate studies.
- Use modern computing techniques and tools to experiment, analyze, and interpret data, and draw appropriate conclusions based on scientific judgement.

### Connection to Other Programs

There are no similar programs at Kentucky public institutions. The University of Louisville currently offers a certificate program in AI in Medicine. Expectations are that enrollment in the certificate will increase, suggesting a related increase in student enrollment in the master's program.

In terms of collaborations, there is a strong bioengineering community at the University of Louisville, built among collaborations amongst faculty in Bioengineering, other faculty within the School of Public Health, the Schools of Information Sciences, Medicine, and Dentistry, and the Speed School of Engineering. This unique partnership will capitalize on the strengths of faculty in all these areas and provide students with opportunities to learn from world renowned experts in AI and bioinformatics.

Program faculty have a long history of collaborations with the following areas/organizations:

- Faculty in the departments of oncology, radiology, math, and psychology
- Cardiovascular Innovation Institute
- Kentucky Spinal Cord Injury Research Center
- Brown Cancer Center

- Center for Predictive Medicine

### **Student Demand**

Initial estimates of enrollment are:

- Year 1 – 5
- Year 2 – 10
- Year 3 – 15
- Year 4 – 20
- Year 5 – 25

### **Employment Demand**

Exponential growth is anticipated in fields related to AI in medicine. The current surge in jobs in the field has led to the creation of advanced degree programs in AI at many schools. One nationwide search for master's programs in AI yielded 22 related programs, of which five were devoted to medical data analysis. These programs achieved 175% growth between 2017 and 2022, with 116% growth in completion rates.

Positions as computer scientists and information research scientists are expected to grow 19% within the next nine years. Target occupations for this type of advanced degree reached over 100,000 annual openings in 2020; the average salary was \$118,000 per year.

### **Budget**

This master's program is integrated with current graduate programs in bioengineering and other programs and therefore does not require additional funding to initiate. As the program grows, one graduate teaching assistant will be requested to assist with the increased course workload. A minor outlay of funds will occur at the beginning of the program to ensure sufficient library materials are available for students.

<b>Projected Revenue over Next Five Years (\$):</b>	\$ 1,406,624
<b>Projected Expenses over Next Five Years (\$):</b>	\$ 155,790