Center for Health Outcomes Research (SLUCOR)

www.slu.edu/slucor/index.php

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Leslie Hinyard, Ph.D., M.S.W.,
Associate Director of Academic Affairs
Eric Westhus, Ph.D.,
Program Director, Health Data Science
Divya Subramaniam, Ph.D., M.P.H.,
Program Director, Health Outcomes Research and Evaluation Sciences

DESCRIPTION
Saint Louis University's Center for Health Outcomes Research (SLUCOR) is a scholarly community of faculty, staff, and students committed to strengthening the delivery and outcomes of medical care through education and training programs, innovative research, and consulting services. As a national leader in research and education SLUCOR improves the health of our communities by informing health care and policy decisions with scientific information about quality and effectiveness.

The mission of SLUCOR is to be a national resource that informs health care and policy decisions with scientific information about quality and effectiveness. Faculty solve complex design and analysis problems in medicine and public health. Faculty are engaged in state-of-the-science evaluations of the services, medications, devices, and diagnostics that can optimize individual health and well-being. SLUCOR is also committed to translating research into policies and practices that improve health outcomes across the population.

SLUCOR offers a Master of Science in Health Data Science, a Master of Science in Health Outcomes Research and Evaluation Sciences, a dual degree program with the School of Law (M.S. /J.D.), and a Post-Graduate Certificate in Health Outcomes Research. SLUCOR also offers a dual degree M.D. /Ph.D. in Health Outcomes Research with the School of Medicine.

SLUCOR also offers undergraduate and graduate courses, as well as student mentorship and training programs for SLU's School of Medicine residents and fellows.

FACULTY
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Angelique Zeringue, Ph.D.

MASTER OF SCIENCE IN HEALTH DATA SCIENCE

Program Highlights
The Master of Science program in health data science is designed to prepare students for a career in today's data-driven health care industry. Successful data scientists possess an artful ability to blend, synthesize and communicate data for use in clinical decisions by patients and providers as well as advancing quality improvement efforts across health systems.

The Health Data Science curriculum and academic training compliments other existing programs and course offerings at Saint Louis University, including Health Informatics (Doisy College), Biostatistics (College for Public Health & Social Justice), and Biomedical Informatics and Computational Biology (College of Arts & Sciences). Students will have the opportunity to take courses from each of these programs.

Curriculum Overview
The goal of the M.S. in Health Data Science program is to provide graduates with the expertise and necessary skills needed to manage, manipulate and analyze large-scale clinical and operational databases. Most core courses will be offered onsite during hours convenient to working professionals. Some core and elective courses will be available through SLUCOR's established online graduate programs. The program may be completed on a full-time or part-time basis.

Students complete 30 credits of coursework across three integrated areas of study:

Applied Statistics
Build capabilities to ask critical questions and draw conclusions from large, complex data with a variety of analytic methods, including predictive modeling, machine learning and data visualization. The program incorporates new software regularly to promote sharp and current analytic skills.

Practical Computing
Learn a diverse set of open source and proprietary software required to link data from disparate sources.
such as electronic medical records, insurance claims, operations data, patient registries and personal health devices. This software includes R, Python, SAS, SQL and Hadoop.

Health Science Applications
Respond to the challenges of a regulated, dynamic industry by understanding unique health care contexts such as privacy protection, government financing, risk contracting, performance monitoring and population health management.

Fieldwork and Research Opportunities
The Master of Science (M.S.) in Health Data Science program offered by SLUCOR will provide traditional students and working professionals with the expertise and hands-on skills needed to meet this increasing demand in the healthcare systems. Focus will be placed on highly sought-after skills in health data manipulation, data visualization, data mining, machine learning and predictive analytics. Students will build programming skills in R, SAS, SQL and Python; as well as gain experience working with advanced computing tools such as Hadoop and MapReduce. This program capitalizes on the existing teaching and research strengths of current SLUCOR faculty, most of whom have experience in the corporate world, in addition to academia.

Careers
After graduating with an M.S. in health data science from SLU, students will be prepared for a career as a data scientist. Data scientists blend, synthesize and communicate data for use in clinical decisions by patients and providers and are able to advance quality improvement efforts across health systems.

Admission Requirements
Successful candidate will have a GPA of 3.0 or better.

Application Requirements
+ Application form and fee
+ Transcript(s) from most recent degrees
+ Professional statement
+ Résumé or curriculum vitae
+ Three recommendation letters

Requirements for International Students
+ A completed Declaration of Financial Support packet with all accompanying documents
+ TOEFL or PTE Academic score
+ Check the English Proficiency Policy page for specific TOEFL and PTE score requirements. Students may also visit the international prospects, applicants and students page for more information about international application requirements.

+ Student visa
+ INTO Saint Louis University offers the Pathway Program for international students who are interested this course but do not meet the direct entry requirements. Visit intostudy.com/slu/programs for more information.

Scholarships and Financial Aid
For more information, visit the student financial services office online at finaid.slu.edu.

Program Requirements

Applied Statistics Courses (9 credits)
- HDS 5310 Analytics and Statistical Programming 3
- HDS 5320 Inferential Modeling 3
- HDS 5330 Predictive Modeling and Machine Learning 3

Practical Computing Courses (9 credits)
- HDS 5210 Programming for Health Data Scientists 3
- ORES 5180 Data Management 3
- HDS 5230 High Performance Computing in the Healthcare Industry 3

Health Science Applications Courses (9 credits)
- HDS 5130 Healthcare Organization, Management, and Policy 3
- ORES 5200 Foundations of Outcomes Research I 3
- ORES 5210 Foundations of Medical Diagnosis and Treatment 3

Capstone Experience (3 credits)
- HDS 5980 Capstone Experience 3

TOTAL CREDITS: 33

Continuation Standards
Students must maintain a cumulative GPA of 3.00 in all required graduate/professional courses.

MASTER OF SCIENCE IN HEALTH OUTCOMES RESEARCH AND EVALUATION SCIENCES

Program Highlights
Health outcomes research is a rapidly expanding, interdisciplinary field that provides evidence and guidance for understanding the endpoints of treatments, interventions, and health care practices, be they clinical, functional, quality of life, or economic. It builds evidence about benefits, risks, and results of treatments, as well as cost and quality of care, that allow clinicians and patients to make informed health care decisions and for policy makers to implement best practices.

The Masters of Science (M.S.) in Health Outcomes Research and Evaluation Sciences program is an entirely online program created in response to the current healthcare climate and need for researchers trained in the areas of health outcomes research, health services research, and program evaluation to meet the changing needs of the healthcare system. The primary goal of the program is to enhance the regional and national workforce with analytical capabilities and
expertise necessary to conduct health outcomes research. An M.S. in Health Outcomes Research and Evaluation Sciences positions students to become leaders in the diverse areas of health outcomes research. Students receive a solid foundation in research methodology, data management and statistical analysis, and scientific writing and presentation.

All SLUCOR programs are offered in a distance-learning, online format to provide scheduling flexibility and to meet the needs of working professionals. This program may be completed on a part-time or full-time basis.

Curriculum Overview
The M.S. in Health Outcomes Research and Evaluation Sciences has two available concentrations: 1) General Health Outcomes Research and 2) Clinical Investigation. Both concentrations require completion of the Core Curriculum (24 credits), the concentration-specific curriculum (12 credits), and the completion of a capstone research project. Students complete a total of 36 credits of coursework. The program may be completed on a full-time or part-time basis.

As a student in this program, you'll learn to:
+ Design, analyze and report results coming from clinical interventions, comparative effectiveness studies, clinical trials, observational studies and economic assessments
+ Design and conduct systematic evaluations of health improvement programs
+ Manage medical research projects from design through dissemination
+ Incorporate interdisciplinary methods to specific fields of study

Fieldwork and Research Opportunities
The Master of Science (M.S.) in Health Data Science program offered by SLUCOR will provide traditional students and working professionals with the expertise and hands-on skills needed to meet this increasing demand in the healthcare systems. Focus will be placed on highly sought-after skills in health data manipulation, data visualization, data mining, machine learning and predictive analytics. Students will build programming skills in R, SAS, SQL and Python; as well as gain experience working with advanced computing tools such as Hadoop and MapReduce. This program capitalizes on the existing teaching and research strengths of current SLUCOR faculty, most of whom have experience in the corporate world, in addition to academia.

Careers
Upon completion of the program, students will be prepared to:
+ Design, analyze and report results coming from clinical interventions, comparative effectiveness studies, clinical trials, observational studies and economic assessments
+ Design and conduct systematic evaluations of health improvement programs
+ Manage medical research projects from design through dissemination
+ Incorporate interdisciplinary methods to specific fields of study

Admission Requirements
Applicants should have a bachelor’s degree from an accredited college or university in a social science, biomedical science or related discipline.

Successful candidates will likely have a GPA of 3.0 or better and place in the 75th or higher percentile on graduate standardized tests (GRE, GMAT or LSAT). The admissions committee reviews TOEFL scores for all international applicants.

Application Requirements
+ Application form and fee
+ Transcripts from most recent degree(s)
+ Professional statement
+ Résumé or curriculum vitae
+ Three letters of recommendation

Requirements for International Students
+ A completed Declaration of Financial Support packet with all accompanying documents
+ TOEFL or PTE Academic score
+ Check the English Proficiency Policy page for specific TOEFL and PTE score requirements. Students may also visit the international prospects, applicants and students page for more information about international application requirements.

Application Deadline
Applications to the program are considered on a rolling basis.

Scholarships and Financial Aid
For more information, visit the student financial services office online at finaid.slu.edu.

Program Requirements
Required Core Coursework (24 credits)
HCE 5330 Research Ethics 1
ORES 5010 Introduction to Biostatistics for Health Outcomes Research 3
ORES 5150 Multivariate Analysis for Health Outcomes Research 3
ORES 5160 Data Management 3
ORES 5300 Foundations of Outcomes Research I 3
ORES 5310 Foundations of Outcomes Research II 3
ORES 5320 Scientific Writing and Communication 2
ORES 5400 Pharmacoepidemiology 3
ORES 5860 Health Outcomes Research Capstone 3

General Concentration
Students must complete the core coursework and the concentration curriculum as follows:

Elective Courses (12 credits)
ORES 5210 Foundations of Medical Diagnosis and Treatment 3
ORES 5260 Pharmacoepidemiology 3
Students must complete the core coursework and the concentration curriculum as follows:

**Clinical Trials Course (3 credits)**
ORES 5420 Clinical Trials Design and Analysis 3

**Research Course (3 credits)**
ORES 5430 Health Outcomes Measurement 3
ORES 5440 Comparative Effectiveness Research 3

**Elective Courses (6 credits)**
ORES 5210 Foundations of Medical Diagnosis and Treatment 3
ORES 5260 Pharmacoepidemiology 3
ORES 5410 Evaluation Sciences 3
ORES 5560 R Programming 3
ORES 5550 SAS Programming I 3
ORES 5560 Qualitative Research Methods 3

**Dual Degree with Juris Doctor**

The M.S. /J.D. dual degree program is offered in collaboration with the School of Law, which is accredited by the American Bar Association. This integrated program requires completion of the professional law school requirements as well as fulfillment of a complete M.S. degree (36 credits), which includes 9 credits from the School of Law J.D. degree requirements.

**Dual Degree Prerequisites**

Students must meet the admission requirements and be admitted into both degree programs according to the processes of each of the participating academic units in order to pursue the dual degree program. Individuals may apply to the M.S. program concurrently with application to the School of Law or following admission to the School of Law; however, admission into the dual degree program is contingent upon admission into both the M.S. and J.D. programs.

Students must complete the M.S. core curriculum as revised here:

**Required Core Coursework (21 credits)**
ORES 5010 Introduction to Biostatistics for Health Outcomes Research 3
ORES 5160 Multivariate Analysis for Health Outcomes Research 3
ORES 5180 Data Management 3
ORES 5300 Foundations of Outcomes Research I 3
ORES 5310 Foundations of Outcomes Research II 3
ORES 5320 Scientific Writing and Communication 2
ORES 5400 Pharmacoepidemiology 3
ORES 5580 Health Outcomes Research Capstone 3

**Research Courses (6 credits)**
ORES 5410 Evaluation Sciences 3
ORES 5420 Clinical Trials Design and Analysis 3
ORES 5440 Comparative Effectiveness Research 3

**Elective Course (3 credits)**
ORES 5210 Foundations of Medical Diagnosis and Treatment 3
ORES 5260 Pharmacoepidemiology 3
ORES 5430 Health Outcomes Measurement 3
ORES 5440 Comparative Effectiveness Research 3

**Continuation Standards**

Students must maintain a cumulative GPA of 3.00 in all required graduate/professional courses.

**Doctor of Medicine & Doctor of Philosophy in Health Outcomes Research Dual Degree**

**Program Highlights**

The M.D./Ph.D. in Health Outcome Research dual degree program is offered in collaboration with the School of Medicine.

This dual-degree in medicine and health outcomes research prepares students to be excellent doctors and clinical researchers.

Graduates leave prepared to provide excellent medical care and to evaluate patient outcomes and preferences, compare the effectiveness of treatments and establish evidence to improve the final stages of care.

**Curriculum Overview**

Students begin their program by completing the first and second years of their M.D. studies. By winter their second year of medicine studies, students will select a Ph.D. mentor from SLU’s Center for Health Outcomes Research.

Completion of all Ph.D. candidacy requirements and oral defense of the doctoral dissertation are followed by a transitional clerkship that facilitates re-entry into the third and fourth year of M.D. studies.

Nine credits of coursework from the M.D. program will count towards completion of the Ph.D. in health outcomes research.

Trainees in this program should complete all requirements for both degrees within seven to eight years and students are expected to complete both the M.D. and Ph.D. components on a full-time basis.

**Admission Requirements**

Students must first be admitted to the School of Medicine to be considered for acceptance into the M.D./Ph.D. in health outcomes research program. Consideration for the program is available to all interested applicants to the School of Medicine with preliminary application provided upon request.

Most trainees are chosen in the early spring in order to begin their research training by mid-June before commencing their first year of M.D. studies in mid-August. Other qualified individuals may apply after beginning their M.D. training.

Applicants to the M.D./Ph.D. program are screened by the Steering Committee for the M.D./Ph.D. program.
Scholarships and Financial Aid
For more information, visit the student financial services office online at finaid.slu.edu.

Program Requirements

Required Courses (20 credits)
- ORES 6010 Introduction to Biostatistics
- ORES 6160 Data Management
- ORES 6500 Foundations of Outcomes Research I
- ORES 6320 Scientific Writing & Communication
- ORES 5430 Health Outcomes Measurement
- ORES 6310 Foundations of Outcomes Research II
- ORES 6150 Multivariate Analysis

Elective Courses (9 credits)
- ORES 5400 Pharmacoeconomics
- ORES 6410 Evaluation Sciences
- ORES 6500 R Programming
- ORES 6550 SAS Programming I
- ORES 5280 Pharmacoepidemiology
- ORES 5420 Clinical Trials
- ORES 5440 Comparative Effectiveness Research
- HCE 6120 Health Care Law
- ORES 6990 Graduate Readings Course

Dissertation Research (12 credits)
ORES 6990 Dissertation Research

Dual Credit
9 credits accepted from the MS1/MS2 of the MD curriculum, as follows:
- Principles of Pharmacology
- Fundamentals of Biomedical Science
- Biostatistics
- Elective in Clinical Research
- Health Care Ethics

Continuation Standards
Students must maintain a cumulative GPA of 3.00 in all required graduate/professional courses.

Post-Baccalaureate Certificate in Health Outcomes Research

Program Highlights
Health outcomes research is a rapidly expanding, interdisciplinary field that provides evidence and guidance for understanding the endpoints of treatments, interventions, and health care practices, both clinical, functional, quality of life, or economic. It builds evidence about benefits, risks, and results of treatments, as well as cost and quality of care, that allow clinicians and patients to make informed health care decisions and for policy makers to implement best practices.

All SLUCOR programs are offered in a distance-learning, online format to provide scheduling flexibility and to meet the needs of working professionals. This program may be completed on a part-time or full-time basis.

Curriculum Overview
The post-graduate certificate requires 18 credits of coursework, which includes courses required for the master's program. Students may choose to apply to the master's program upon completion of the certificate, and courses completed for the certificate can be used as credit towards the M.S. degree.

Admission Requirements
Applicants should have a bachelor's degree from an accredited college or university in a social science, biomedical science or related discipline.

Successful candidates will likely have a GPA of 3.0 or better and place in the 75th or higher percentile on graduate standardized tests (GRE, GMAT or LSAT). The admissions committee reviews TOEFL scores for all international applicants.

Application Requirements
+ Application form and fee
+ Transcripts from most recent degree(s)
+ Professional statement
+ Résumé or curriculum vitae
+ Three letters of recommendation

Requirements for International Students
+ A completed Declaration of Financial Support packet with all accompanying documents
+ TOEFL or PTE Academic score
+ Check the English Proficiency Policy page for specific TOEFL and PTE score requirements.

Students may also visit the international prospects, applicants and students page for more information about international application requirements.

Application Deadline
Applications to the program are considered on a rolling basis.

Scholarships and Financial Aid
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Program Requirements

Required Courses (15 credits)
- ORES 5010 Introduction to Biostatistics for Health Outcomes Research
- ORES 6150 Multivariate Analysis for Health Outcomes Research
- ORES 5300 Foundations of Outcomes Research I
- ORES 5310 Foundations of Outcomes Research II
- ORES 5400 Pharmacoeconomics

Elective Course (3 credits)
- ORES 5210 Foundations of Medical Diagnosis and Treatment
- ORES 5280 Pharmacoepidemiology
- ORES 6410 Evaluation Sciences
- ORES 5420 Clinical Trials Design and Analysis
- ORES 5430 Health Outcomes Measurement
- ORES 5440 Comparative Effectiveness Research
- ORES 5550 SAS Programming I
- ORES 5560 R Programming
- ORES 5580 Qualitative Research Methods

Continuation Standards
Students must maintain a cumulative GPA of 3.00 in all required graduate/professional courses.