Research, AI, & Data Science Solutions

Life Sciences & Health

NORTHEASTERN UNIVERSITY
ROUX INSTITUTE

The Roux Institute partners with organizations to advance research and develop solutions at the intersection of AI, data science, and life sciences and health, leveraging our faculty expertise, graduate students, and facilities.

AREAS OF EXPERTISE

Behavioral Neuroscience | Diseases of Aging | Epidemiology | Proteomics | Cancer | Cardiology | Metabolic Engineering | Synthetic Biology | Film Metamaterials | Reactive Extrusion Chemistries | Rural Health | Pathology | Movement Neuroscience | Mental Health | Public Health | **+ more**

CORE CAPABILITIES

Classical ML

- Predictive ML & time series
- Statistical modeling
- Causal inference
- Recommendation systems
- Anomaly detection

Modern AI

- LLMs/vLLMs — prompting & SFT
- Intelligent document processing
- Chatbots & AI assistants
- Agentic AI & coding agents
- RAG & GraphRAG pipelines
- ETL/ELT & data quality
- Transformers & multi-modal

Full-Stack Software Dev

- UI/UX design
- Frontend development
- Backend development
- Cloud: AWS, Azure, GCP
- Containerization & MLOps

Study Design & Evaluation

- Clinical & translational study design
- Outcomes measurement
- Comparative effectiveness research
- Implementation science
- Health equity analysis

WAYS TO ENGAGE

Working Lab

Interdisciplinary graduate student teams, supervised by faculty, work on a defined partner challenge and deliver actionable outputs.

Applied Solutions

Faculty-led solutions development or technical lab services, with defined scope, deliverables, and timeline.

Embedded Advisory

A partner organization retains a Roux subject-matter expert for ongoing advisory support and thought partnership.

Research Collaborations

Co-investigator partnerships on grant-funded research, leveraging Roux faculty expertise and infrastructure for shared scientific aims.

CASE EXAMPLES

WORKING LAB

LifeFlight of Maine

Reducing Emergency Dispatch Times

Roux data analytics students analyzed operational data from Maine's only air ambulance service to identify factors driving delays in chute time, delivering predictive models and operational recommendations.

APPLIED SOLUTIONS

Santovia Path AI

Computer Vision Pathology Model for Clinical Efficiency

Roux research faculty developed a computer vision model to increase accuracy and efficiency in tumor grading for pathologists.

APPLIED SOLUTIONS

Salmonics

Western Blot Testing for Salmon Waste Biomedical Products

Using BioCoLab facilities, Roux staff performed western blot testing to assess protein expression and product quality for a biotech converting salmon waste into high-value biomedical products.

EMBEDDED ADVISORY

EmpoweRx

UX Design Advisory for Healthcare Staffing Platform

Roux expertise supported UX design for an intuitive platform serving both clinicians and healthcare hiring managers.