URIKA [bioworks] FAU Undergraduate Internships Description

Summer 2024

URIKA [bioworks] would like to sponsor 2 or 4 students in a summer internship combining biology with computational, semantic and technology disciplines to develop demonstration solutions for biology knowledge exploration.

- The overall objective is to create a knowledge repository for the world's cumulative knowledge of cardiac tissue capable of answering scientific queries about the biology of the heart.
- Each **pair of students** would be comprised of **one Biology** student and **one Data Science** student collaborating together to achieve the summer objectives
- Internship would **begin June 17th and end August 30th.**
- **Minimum (20) hours per week** (although students can work up to 40 hours a week)
- Work would be **either on campus or remote with one day per week face to face on campus** with the URIKA [bioworks] local Partner, John Piccone.
- While this internship is unpaid, *it may be taken for up to (3) course credits* and will provide students with very relevant, timely, and transferable experience in the field.

Summer Objectives:

1. Launch Internship
   - 1.1. Introduce team members
   - 1.2. Introduce objectives and approach
   - 1.3. Establish project timeline and deliverables
   - 1.4. Overview of technology and science material required for execution
2. Establish Technology Infrastructure
   - 2.1. Establish technology cloud infrastructure for hosting data, knowledge graph and query/dashboard tools (AWS, RDBMS, Neptune and Metaphacts)
   - 2.2. Import knowledge corpus from business partner into cloud platform
   - 2.3. Understand and explore knowledge corpus sources, data model and information model (ontologies and knowledge graph)
3. Develop scientific knowledge applications (informational list, not all will be possible given summer timeline)
   - 3.1. Develop dashboards for current Cardiac Target Landscape
   - 3.2. Develop dashboards for emerging Cardiac Target Landscape
   - 3.3. Develop target dashboard for known Cardiac Adverse Effects
   - 3.4. Develop dashboards for several known cardiac targets (target evaluation framework)
   - 3.5. Visualize targets in genetic, functional, pathway, anatomic, histologic, symptom, diagnosis, comorbidity overlays
   - 3.6. View therapeutic agents approved against targets
   - 3.7. View emerging assets being pursued against pipeline targets
   - 3.8. View hx timeline of target discoveries
   - 3.9. View projected milestones for pipeline targets
   - 3.10. View edge of scientific envelope for cardiac biology and data required from synthetic biology
   - 3.11. Define confirmatory use cases (cases where information discovery is confirmed by experimentation)
   - 3.12. Define failure use cases (cases where information discovery is disproven by experimentation)
   - 3.13. Identify target or biomarker related causes for pipeline failures (clinical trials, IND, NDA, etc)

4. Conclude internship
   4.1. Debrief and review accomplishments, learnings, recommendations for improvement
   4.2. Final presentation by interns to URIKA, CMBB, Biology and Data Science leadership

URIKA [bioworks] local Partner (John Piccone) will provide overview of required disciplines, reading materials and resources for interns at initiation of internship (week 1). Disciplines include:

- Cloud infrastructure (Amazon Web Services) and administration
- RDBMS (Relational Database Management System)
- Neptune (AWS graph database)
- Metaphacts (graph database query tool and dashboard tool)
- Fundamentals of knowledge graphs (data structures, query language)
- Fundamentals of semantic solutions (ontologies)
- Representing and exploring biological knowledge in digital form
- Fundamentals of Drug and Target Discovery
- Fundamental documentation of system/solution/product requirements

Open to all **junior and senior-level undergraduate students, as well as graduate students**

Preferred qualifications:

- **Biology intern:** coursework completed in or an understanding of anatomy, histology, molecular biology, genetics, biochemistry, immunology
- **Data Science intern:** coursework completed in or an understanding of programming language, database skills, data structures, algorithms

To be considered for this opportunity, please email a copy of your unofficial transcripts and a current resume to Jessica Hibberd at jlewis92@fau.edu no later than Friday, June 7.