

## Computer Programmer

The Tulane University Biodiversity Research Institute (TUBRI) is a research center of Tulane's School of Science and Engineering, located on the grounds of the F. Edward Hebert Research Center in Belle Chasse, Louisiana, a suburb of New Orleans. TUBRI houses the Royal D. Suttkus Fish Collection and specializes in biodiversity discovery (primarily involving fishes) and biodiversity informatics research. Henry L. Bart, Jr., Professor of Ecology and Evolutionary Biology serves as TUBRI Director and Yasin Bakış is Senior Manager of Biodiversity Informatics and Data Engineering for the center.

A computer programmer is sought to build cyberinfrastructure for accessing, hosting and sharing images of fish specimens from institutional image repositories and iNaturalist for use by investigators in the newly-funded, NSF Harnessing the Data Revolution Institute project entitled, *Imageomics: A New Frontier of Biological Information Powered by Knowledge-Guided Machine Learning*. The images will be used in Machine-Learning based, taxonomic identification and morphological trait extraction experiments, aided by a fish anatomy ontology and trees depicting phylogenetic relationships among tested fish species.

The successful candidate will perform the following tasks in the Imageomics Institute Project under the supervision of Bart and Bakış.

1. Create automation to process 700,000+ 2D images and associated metadata
2. Extract morphological traits including segmentation, shape outlines of specimens, strings of pixels representing color/pigment patterns from different areas of the fish image, color palette data, histogram data etc. to verify species identity
3. Build software for
  - a. Extracting several different types of morphological features from fish images automatically
  - b. Calculating the subsets of features (morphological barcodes) useful for identifying clusterings of images based on Genetic Algorithms Feature Selection methods
  - c. Implementing a Neural Network design for training computers in fish classification using the extracted morphological traits
  - d. Work collaboratively with other Imageomics Institute ML experts to explore deep-learning methods to capture species identification and trait data from other types of animal images.

### Required Knowledge, Skills, and Abilities

- Image Processing
- Artificial Intelligence/Neural Networks
- Genetic Algorithms
- Working knowledge of following languages (one from each group)
  - Java, C, C++, C#}, {Python, PHP, Perl}, {R, Bash, JavaScript}, {ORACLE SQL, MSSQL, PostgreSQL, MySQL}
- Unix based server management
- Parallel programming (GPU)
- Working knowledge of version control system (GIT)
- Documenting the code

- Ability to write clear, maintainable, portable code that conforms to standards and practices
- Cross-platform experience

### **Required Education and/or Experience**

- College degree (Associates or Bachelors) in Computer Science, Information Sciences, Biology, and related fields.
- Must have at least 3 years of programming experience

### **Preferred Qualifications**

- MSc or PhD in computational biology, bioinformatics, biology or a related field
- Experience in web-database applications
- Prior experience with Biological datasets

### **Other Requirements**

- The position is open to international candidates
- Candidate should be able to travel internationally

**Start date:** The position is open for immediate hire. Preferred starting date is 4 February 2022

For additional information about the position, please contact Henry Bart ([hbartjr@tulane.edu](mailto:hbartjr@tulane.edu)) or Yasin Bakış ([ybakis@tulane.edu](mailto:ybakis@tulane.edu))

Apply here: <https://jobs.tulane.edu/position/IRC22108>