

Genomics: Using Calculations as an Outreach Strategy

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Science Background

- Have used Genomics training to get Minority Scientists, mostly Afro-Americans and Hispanics at minority serving institutions to make use of HPC.
- Several success stories of full genomes or transcriptomes as well as metagenomes.
- Other success stories in using the Pittsburgh Supercomputing Center's YARC data machine to solve the traveling salesman problem to identify genes involved in cancers.

Science Background

- Have also used the program as a means to recruit minority scientists for training as well other Outreach activities.
 - ARBSCM meeting
 - Visit new minority serving institutions
 - Recruit more users of training activities
 - Recruit XSEDE Campus Champions
 - Program has been funded from NIH-NIGMS Minority Access to Research Careers (MARC) program for almost 15 years.

ABRCMS Meeting

(Annual Biomedical Research Conference for Minority Students)



Worked booth with Linda Akli while Alex worked with local (Nashville area) genome researchers. In booth we presented material on both XSEDE internships and the MARC workshop and internship program.

Alex's Week

- Worked with Carl Darius originally an MARC intern from TNSU and now a postdoctoral student at Vanderbilt Medical School.
- Worked with Korsi Dumenyo (TNSU Faculty) on bacterial genomes.
- Worked with Suping Zhou (TNSU Faculty) on bacterial projects.
- Chicken Genome with Xiaofei Wang (TBSU faculty)

Alabama A & M



Met with Dr. Jenette Jones of the Biology and Environmental Sciences department. They have an interest in improving their curriculum by improving both their bioinformatics and genomics and would like a return visit to give a workshop or at least a lecture. Presented both XSEDE and MARC material. We got a Physics faculty applicant for our MARC workshop, but she dropped out because of her pregnancy.

Morehouse College



Met with Dr. Kenneth R. Perry, an XSEDE Campus Champion, of the Computer Sciences department and Dr. Terry Mills, Dean of Research, with an interest in Humanities. They have an interest in improving their curriculum by improving their curriculum and would like a return visit to give a workshop or at least a lecture. Presented both XSEDE and MARC material. We got a MARC workshop attendant for the first time from Morehouse Medical.

Training – Workshop bioinformatics

- Combination of traditional bioinformatics and genomics.
 - Review of database searching, local and global multisequence alignment, focus on workup of gene or protein family, multiple dimensional scaling, and phylogenetics (Dannie Durand).
 - Fit this material into less than a week.
 - Instructors: Hugh Nicholas, Alexander Ropelewski, Ricardo Gonzalez (UPR Medical Sciences).

Training – Workshop Genomics

- We have gradually developed a complete range of genomic analyses which takes over a week to present. Dr. M. Barmuda (U. Pitt – Human Genetics) presents an introduction to Next Generation Sequencing (NGS). Alexander Ropelewski, PSC, presents both genome and transcriptome assembly, Dr. Joel McManus presents using NGS for ribosomal footprinting experiments, and Brian Couger a graduate student at Oklahoma State U. presented metagenomics analysis.

Training – Workshop Genomics

- The last part of the workshop material is extremely important. It consist of and introduction to Python programming with a focus on putting things into a relational database to assist in further analysis. It is taught by Bienvenido Velez of the University of Puerto Rico at Mayaguez and by Alex Ropelewski.

MARC Internship

- Additional material presented for the MARC internship is a series of lectures on the R statistical programming language presented by Dr. Luis Vasquez-Quinones of Universidad Metropolitana in San Juan Puerto Rico.

MARC Internship Projects

Dr. Suping Zhou / Mentor: Alexander Ropelewski

A draft of the genome of a new *Bacillus cereus* strain, tsu1. Faculty at TNSU.

Janeth Rodriguez / Mentor: Hugh Nicholas.

Characterized the Heat Shock 70 (HSP70) protein for its potential in being used as a biomarker for Hepatocellular Carcinoma. Graduate student at UTEP.

MARC 2012 Workshop



MARC 2012 Interns

