Muyi Liu

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Education

Ph.D.	Biological Sciences	Purdue University	3.7/4 (GPA)	August 2017
M.S.	Computer Science	Purdue University	3.8/4	May 2017
B.E.	Computer Science	Tsinghua University	84.1/100	July 2006

Purdue CS Master

CS50300	Operating Systems	A
CS58000	Algorithm Design, Analysis, and Implementation	A
CS50200	Compiling and Programming Systems	B+
CS51400	Numerical Analysis	A-
CS53000	Introduction to Scientific Visualization	A
CS54701	Information Retrieval	A
CS57800	Statistical Machine Learning	B+
CS57900	Bioinformatics Algorithms	A

Research Experience

Graduate Research Assistant

- Frequent Subgraph Mining Algorithm Design (NP-Hard Topic)
  Outperforms gSpan and Margin Algorithms
- ncRNA Function Prediction Pipeline
  Supervised Graph Classification Modeling by FSM (AUROC > 0.9)
- Protein Structure Prediction and Folding Simulation
- Single Cell Genomics RNA-Seq Data Analysis
  Cell Type Predication (Self-developed Supervised Classification, Seurat, and Monocle)
  Cell Type Correlation (Self-developed Enrichment Score, Monocle, and SC3)
  Cell Differentiation Tracing Analysis (Monocle)
  Collaboration Project: iPS Cell Differentiation Analysis

Publication and Presentation

Publication

- M. Liu, and M. Gribskov, "MMC-Margin: Identification of Maximum Frequent Subgraphs by Metropolis Monte Carlo Sampling" in *2015 IEEE International Conference on Big Data*, IEEE, 2015 (Acceptance Rate: 17%)
- M. Liu, and M. Gribskov, "Adapt Frequent Subgraph Mining Algorithms to noncoding RNA Topology Alignment and Function Prediction" (Preparation)

Invited Talk

- "MMC-Margin: Identification of Maximum Frequent Subgraphs by Metropolis Monte Carlo Sampling" in 2015 *IEEE International Conference on Big Data*, Oct 31st, 2015, Santa Clara, CA

- "Adaptation of Frequent Subgraph Mining Algorithms to Noncoding RNA Topology Alignment and Function Prediction" in *invited seminar* University of Massachusetts Medical School, Nov 14th, 2017, Worcester, MA

Skill

Language

- C++, MATLAB, Python, R, and Perl *Research Related*
- Java, Delphi, Pascal, VHDL, Shell Script, X86, and MIPS Assembly *M.S. and B.E. Projects*

Machine Learning and Data Mining

- NP Algorithm Design, Metropolis Stochastic Sampling, Graph Classification, and Cluster MPI Programming *Research Related*

Bioinformatics and Wet Lab

- Single Cell RNA-Seq Cell Type Classification, iPS Cell Differentiation Analysis, Protein (CABS) and ncRNA (RNAFold) Structure Prediction, Genomics Sequence Analysis *Research Related*

Others

- Embedded System OS Implementation, VHDL, Network Programming, Processor Instruction Simulation, VTK and GPU Programming *M.S. and B.E. Projects*

Manuscript Review

- "Isomorphism Identification of Planar Kinematic Chains Based on Characteristic Arrays and Automatic Programming" in 2018

M.S. and B.E. Projects

- Siemens Power System Control OS Development
- XINU OS Implementation
- Decision Tree and Random Forest Classification (Yelp Ranking)
- Page Rank Classification

Teaching Experience

BIOL 231	Cell Structure and Function	Summer 2017
BIOL 111	Fundamentals of Biology	Spring 2017 Spring Fall 2016 and 2015
BIOL 121	Ecology, Evolution and Environmental Biology	Summer 2016
BIOL 221	Introduction to Microbiology	Fall 2014

Award

Purdue Research Assistant	2010-2014
Travel Award of Purdue University PULSe Program	2015
Scholarship of College Entrance Examination from Gansu Provincial Government	2002
Membership Award of Students Union in Tsinghua University	2004

Diversity

Membership of the Students Union, Tsinghua University	2002-2006
Membership of Soccer Association, Tsinghua University	2002-2006
Volunteer Tutoring	2000-2009