Geoffrey Mon

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EDUCATION

Princeton University, Princeton, NJ, USA

- B.S.E. in Computer Science — September 2017 – expected May 2021
  - GPA (as of Spring 2020): 3.929 / 4.000
  - Senior thesis: Finding minimum cuts in balanced directed graphs with cut queries
  - Advisor: Prof. Matthew Weinberg

RESEARCH

Reconstructing partition matroids with rank queries — 2020
Princeton University

- Advisor: Prof. Matthew Weinberg
- Investigated the query complexity of reconstructing partition matroids with rank queries
- Developed a new randomized algorithm with optimal query complexity for partition matroids with equal-sized partitions and independent sets that have at most one item from each partition
- Manuscript in preparation
- Supported by Princeton's Office of Undergraduate Research via OURSIP

Leveraging geometric structure to cluster single-cell genome data — 2019 – 2020
Princeton University

- Advisors: Prof. Benjamin Raphael, Dr. Gryte Satas, and Dr. Simone Zaccaria
- Designed and implemented a clustering algorithm exploiting geometric structure in cancer genome data, for use in a CNA calling algorithm
- Supported by Princeton's Office of Undergraduate Research via OURSIP

Investigating phylogenies of SNVs and CNAs — 2018
Princeton University

- Advisors: Prof. Benjamin Raphael and Dr. Gryte Satas
- Evaluated two existing phylogeny inference algorithms on a cancer genome dataset
- Found that these algorithms' phylogenetic trees, inferred from only SNV data, were often inconsistent with CNA data from the same dataset
- Results motivated a new algorithm, SCARLET, that uses both SNV and CNA data
- Published [1]

Implementing dictionary learning in Apache Flink — 2016
University of Georgia

- Advisor: Prof. Shannon Quinn
- High school research intern
- Implemented features for the Python API of Apache Flink and ported a rank-1 dictionary learning algorithm for fMRI data from Apache Spark to Flink
- Supported by the University of Georgia's Young Dawgs Program
- Published [2,3]

PEER-REVIEWED JOURNAL PUBLICATIONS

[1] Gryte Satas, Simone Zaccaria, Geoffrey Mon, and Benjamin J. Raphael. "SCARLET: Single-Cell Tumor Phylogeny Inference with Copy-Number Constrained Mutation Losses". In: *Cell Systems* 10.4 (2020), 323–332.e8. DOI: 10.1016/j.cels.2020.04.001

[2] Milad Makkie, Xiang Li, Shannon Quinn, Binbin Lin, Jieping Ye, Geoffrey Mon, and Tianming Liu. "A Distributed Computing Platform for fMRI Big Data Analytics". In: *IEEE Transactions on Big Data* 5.2 (2019), pp. 109–119. DOI: 10.1109/TBDATA.2018.2811508

WORKSHOP PUBLICATIONS

[3] Geoffrey Mon, Milad Makkie, Xiang Li, Tianming Liu, and Shannon Quinn. "Implementing dictionary learning in Apache Flink, Or: How I learned to relax and love iterations". In: *2016 IEEE International Conference on Big Data (Big Data)*. 2016, pp. 2363–2367. DOI: 10.1109/BigData.2016.7840869

OTHER EXPERIENCE

MediaWiki Project

- Open-source volunteer contributor 2013 – 2017
  Fixed bugs and implemented user interface, API, and backend features in MediaWiki, related extensions, and infrastructure that are used on Wikipedia and other MediaWiki-powered websites.
- Pywikibot project member 2016 – 2017
  Fixed bugs and implemented new features in Pywikibot, a Python library used by Wikipedia utility bots.
- Google Code-In finalist for Wikimedia Foundation 2014, 2015

CAMPUS ACTIVITIES

Princeton University Math Competition, Princeton University

- Staff member, tech team 2018 – present
  - Maintained the competition website and the logistical backend used for grading work.
  - Served as staff on competition day, registering teams and organizing supplementary events for students.

Princeton Quiz Bowl, Princeton University

- Team member 2018 – 2019
  - Participated in ACF Fall 2018, Northeast SCT 2019, and other tournaments.

[*Compiled on 2020-11-19*]