Xinru Liu | Curriculum Vitae

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Education

Wheaton College **Norton, MA**
Degree of Bachelor of Arts (expected May 2019) *Sept 2015 - Present*

Academic Qualifications...

- Double Major: Mathematics, Computer Science
- Double Minor: Statistics, Music Performance
- GPA(overall): 3.95/4.0   GPA(majors): 3.92/4.0
- Honors: Phi Beta Kappa Membership; Wheaton Dean's List (Fall 2015 - Fall 2018); May Fellow Scholar; Wheaton Fellow; Helen Zoe Duncan Prize in Piano Performance (2017, 2018); Edna D.Parks Prize in Music Theory (2017).

Technical and Personal skills

- **Programming Languages:** C/C++, OpenGL API, Python, R, SQL, JavaScript, HTML&CSS, Mathematica, LaTeX
- **Operating Systems:** Linux, Windows, Mac OS
- **Industry Software Skills:** Microsoft Office Tools, Prezi
- **Languages:** Native speaker in Chinese, proficient in English

Research Experiences

Mathematics Honors Thesis **Norton, MA**
Department of Mathematics, Wheaton College *Sept 2018 - Present*
Advisor: Dr. Michael Kahn

- Build Hidden Markov Model on digitized music and compute the similarity matrices between pieces from different composers.
- Estimate the parameters of the HMM model using Baum Welch algorithm.

NSF Summer REU at DIMACS in Data Analytics **Piscataway, NJ**
Department of Industrial and System Engineering, Rutgers University *May 2018 - Sept 2018*
Mentor: Dr. Weihong Guo

- Developed a data fusion method that could effectively fuse the different sources of sensor data and process data to evaluate the quality of 3D-printed parts.
- Employed dimension reduction techniques (uncorrelated multilinear principal component analysis, etc.) for extracting spatial patterns from high-dimensional measurement images of 3D-printed dome-shaped objects.
- Trained two-level classification model using random forest to guarantee time efficiency while maintaining high accuracy.

Lexomics Software Development Research **Norton, MA**
Department of Computer Science, Wheaton College *Jun 2017 - Sept 2017*
Mentor: Dr. Mark LeBlanc

- Performed hierarchical agglomerative clustering analysis on tokenized texts and displayed the results in dendrograms.
- Employed exploratory analyses to check for errors and detect high-level patterns.
- Sharpened programming skills by coding in multiple languages (Python, Javascript, R, HTML/CSS).

Schwarzschild Geometry Simulation Research
Department of Physics, Wheaton College
Mentor: Dr. Dipankar Maitra

Norton, MA
Jun 2017 - Sept 2017

- Used C++ GNU Scientific Library to simulate the accurate trajectory of photons near the black hole based on a starting radius and an initial angle.
- Generated plots for all trajectories using Gnuplot.
- Set position for a detector and calculated the ratios of photons hitting and failing to hit the detector.

Eye-tracking Technology Research
Department of Computer Science, Wheaton College
Mentor: Dr. Mark LeBlanc

Norton, MA
Sept 2016 - Dec 2017

- Learned to use Tobii Pro Glasses II wearable eye-tracker to track people's gaze while looking at paintings, music sheets, websites, etc. and generated heat maps from wearer's eye gaze data.
- Applied the eye-tracking technology on sight-reading piano music and explored the differences in eye movement patterns of the experienced and beginner pianists.
- Produced two user manuals for faculty and students that train with the Tobii eye-tracking software.

Publications

- **Gui X., Liu X., Qi T., Guo W.** (2018). Multimodal Data Fusion in 3D printing Quality. *IEEE Sensors Letters*, DOI 10.1109/LSENS.2018.2881475.

Presentations

WIMIN Conference, Smith College
Multimodal Data Fusion in 3D printing Quality

15-minute talk
Sept 2018

NCUWM Conference, University of Nebraska-Lincoln (Approved)
Multimodal Data Fusion in 3D printing Quality

15-minute talk
Jan 2019

Work Experiences

Calculus and Introductory Statistics Tutor
Department of Mathematics, Wheaton College

Norton, MA
Sept 2016 - Present

- Tutored 10 students on average in Calculus and Statistics every week.

Statistics Grader
Department of Mathematics, Wheaton College

Norton, MA
Sept 2017 - Present

- Graded homework for Accelerated Statistics (MATH 151) and Methods of Data Analysis (MATH 251).

Leadership and Extra-curricular Activities

Flute & Solo Pianist
Department of Music, Wheaton College

Norton, MA
Sept 2015 - Present

- Performed first movement of Grieg Piano Concerto in A minor with Wheaton Great Wood Orchestra in December 2018.
- Played the flute for two years in Wheaton Great Wood Orchestra.
- Performed on student recitals, chamber music ensembles, and academic festival every semester.

Marketing Officer & Treasurer
Wheaton Asian Student Association

Norton, MA
Sept 2016 - Present

- Made plans on club's budget and reported the expense monthly.
- Designed posters for 10 club activities annually.
- Created ongoing dialog with group members to brainstorm on how to expand, promote, and strengthen the association.
- Embraced club diversity by holding cultural events with other campus clubs.