Vijay Koju

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EDUCATION

Middle Tennessee State University, Murfreesboro, Tennessee
- Ph.D. in Computational Science — May 2017 (Expected)
- Master of Science in Computer Science — December 2015

Truman State University, Kirksville, Missouri
- Bachelor of Science in Physics (Minor: Mathematics) — May 2012

EXPERIENCE

Middle Tennessee State University, Murfreesboro, TN — August 2012 – Present
Research/Teaching Assistant
- Optimized 1D photonic crystals using genetic algorithm, simulated annealing, and particle swarm optimization.
- Demonstrated an order of magnitude improvement in sensitivity of photonic bio-sensors via azimuthal control.
- Conducted astronomy labs, tutored undergraduate physics and graded homework for calculus based physics classes.
- Mentored an undergraduate student with her senior thesis on extraordinary acoustic transmission using COMSOL Multiphysics, which resulted in a journal publication.

Oak Ridge National Lab, Oak Ridge, TN — June-August 2014, 2015
Computational Biomedical Optics Summer Intern
- Parallelized serial Monte Carlo (MC) for light transport in scattering media using OpenMP and MPI.
- Analyzed 10+ TB of MC simulation data, using Python and Bash scripts, and C++ analysis code.
- Established a positive correlation between the geometric Berry phase and photon penetration depth in turbid media.

Truman State University, Kirksville, MO — June-August 2010, 2011
TruScholar Summer Undergraduate Researcher
- Developed Python programs using NumPy, and Matplotlib to extract, analyze, and visualize the light curve data of eclipsing binaries (EBs) from the *OGLE* and *Kepler* mission databases.
- Analyzed 5+ GB of light-curve data of ~1000 EBs, classified them using unsupervised K-means clustering algorithm.
- Proposed differential migrating star-spots as a possible cause of time-dependent asymmetry in light-curves of EBs.

PROJECTS

- Implemented a 3D Object-Oriented Scattering Matrix based Rigorous Coupled Wave Analysis code in C++ and MATLAB, achieved ~20% efficiency by cascading and doubling algorithm.
- Developed database driven university course and photography conference scheduler, where I contributed in building databases, writing SQL queries, and drawing EER diagrams.
- Classified the winning and losing moves in the tic-tac-toe game using learning algorithms based on Naïve Bayes probability and decision tree approaches.
- Solved Traveling Salesman's Problem in Python using simulated annealing and genetic algorithm.

TECHNICAL SKILLS

Python, C, C++, MATLAB, R, FORTRAN, SQL, UNIX, Linux, Mac, Windows

JOURNAL PUBLICATIONS

- V. Koju, and W. M. Robertson, "Excitation of Bloch-like surface waves in quasi-crystals and aperiodic dielectric multilayer structures", *Optics Letters*, 41, 2915-18 (2016)
- V. Koju, and W. M. Robertson, "Slow light by Bloch surface wave tunneling", *Optics Express,* 22, 15679-85 (2014)

AWARDS

- SPIE Young Scientist Awards (1st Place) — September 2017
- MTSU Scholars Week Poster presentation (2nd Place) — March 2013