Marc Aurèle Gilles

Resume

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Research Interests

Numerical Analysis, Numerical Linear Algebra, Spectral Methods, Inverse Problems, Optimization, Image Processing.

Current Research

Continuous Analogues of Krylov-Based Methods

Generalizing popular iterative solvers of linear equations to solve differential operators.

Inverse Problem in Wave Propagation

Characterizing the atmosphere above the ocean through the use of radars. Involves physical simulation, numerical linear algebra and optimization.

Adversarial Path Planning

Finding optimal path for a path planner around unknown observer locations. Uses non-smooth optimization techniques and fast methods to solve nonlinear differential equations.

Work Experience

June 2017 –Aug 2017

Research Intern

Mathematics and Computer Science Division, Argonne National Laboratory

Wrote software to perform reconstruction of nanometer scale 3D objects from x-ray measurements. This involved solving an inverse problem with hundreds of millions of variables which ran on a supercomputer. The code was written in C and achieved high performance using MPI and MKL. Collaborated with a team of physicists and mathematicians.

May 2013 – Aug 2013

Undergraduate Researcher

Center for Discrete Mathematics and Computer Science, Rutgers University

Worked on image processing of biological images. The project involved manipulating the Fourier spectrum of 3-D images obtained by DIC imaging. Built a GUI in Python.

Computer Skills

MATLAB, python, C++, C, Eigen, OpenMP, MPI, MKL, LaTeX, Linux, Git

Education

2014 – Present Doctor of Philosophy
Applied Mathematics
Cornell University
GPA: 4.11
Expected graduation: May 2019

2012 – 2014 Bachelor of Arts
Summa Cum Laude
Mathematics
Rutgers University
GPA: 3.96

Awards

2017 NSF MSGI
National Science Foundation

2014 Lawrence Corwin Memorial Math Prize
Rutgers University

2014 High Honors in Mathematics
Rutgers University

2013 Stanley E. Brasefield Mathematics Scholarship
Rutgers University

Extracurricular Activity

2016 European Summer School in Modelling Analysis and Simulation in Crime and Image Processing
University of Oxford

2016-2017 Organizer of the Student-Invited Speaker Colloquium Series
Cornell University