William Huanshan Chuang

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Research Interests

I am interested in mathematical physics, number theory, moduli spaces of curves, and Ads/CFT conjecture. Current projects including using Kontsevich-Soibelman Wall-Crossing Formula to study the 2d-4d invariants in moduli space of solutions of Hitchin equations over a compact Riemann surface with gauge group SU(n), and using classical gravity to constrain some results that are derived from Hilbert-Pólya conjecture by computing linear response observables of Hawking-Page transition at the classical limit (saddle point), and using supersymmetry.

Education

Department of Mathematics and Statistics, University of San Francisco Spring 2015 – current.

Honor Mathematics, and Computer Science minor, Expected 2018.

Major GPA: **4.0 / 4.0**

Publication: *Revealing a Possible Implication by Imposing Lee-Yang Theorem on the Partition Function of the Universe*.

Research

Current Projects

Research Assistant for Prof. Jeff Hamrick at USF (2016 – current)

Volunteer student programmer for Prof. David Galles (2016 – current)

Past Projects

Guru, Google CS-First Program, Summer 2016, San Francisco

Volunteer, ACM Special Interest Group on Management of Data SIGMOD, San Francisco (Summer 2016)

Teaching Assistant for National Dong Hwa University, Dep of Physics (Fall 2008 – Spring 2010)

Research Assistant for Prof. Cheng-Pang Liu at National Dong Hwa University, Dep of Physics (Spring 2010)

Mathematical Physics Course Projects

A Try (self-studied) on Deriving Maxwell Equations by Using Vector Analysis

A Mini Course Project: Two Approches to Understand Gravitational Lensing

A Consistency Verification of Extended Theories of Gravitation

A Note on Introduction to Quantum Gravity in (2+1)-Dimensions

A Differential Geometry Project: Derive Atiyah-Singer Index Theorem - by using six distinct approches

Papers Reading on Ads/CFT (Gauge/Gravity duality)

A Breif Talk on Kontsevich-Soibelman Wall-Crossing Formula (KSWCF) Derivation, and the Connection between KSWCF and 2d-4d generalized Donaldson-Thomas Invariants

Computer Science Course Projects

Racing Cubes–Human VS. Self-Driving Cubes on A MÃűbius Strip (implemented in C++, Ogre, and with Huffman Coding for Quantizing Neural Nets; started from scratch, i.e., without using any existed Neural Network libraries)

Linked List Assignment: Playing with Sound (in Java)

Huffman Coding

Persistent Data Structures (BST and Stack)

Dijkstra, Binomial Heaps, Hash Tables, and More!

Skills

Programming

Languages: R, C/C++, Python, Java, Scheme

Libraries/Software: CUDA, Numpy, TensorFlow, Torch

Database/Toolkit: Spark SQL, MongoDB

Methods

USF Classes: Combinatorics, Introduction to Computer Science (Python and Java), Graduate Algorithms, Automata Theory, Game Engineering, Computer Architecture, C and System Programming, Data Structure, and Algorithms

Transferred NTU Classes(2010–2013): Calculus I, II, and III, Real Analysis, Linear Algebra, Intro to Formal Methods, Linear Algebra and Probability, Discrete Mathematics, Applied Mathematics I, II, and III, Computational Physics, Thermal Physics, Modern Physics, Quantum Physics I and II, Classical Mechanics I and II, Electrodynamics I and II, Statistical Mechanics II, Mathematical Physics I, Differential Geometry, Intro to Particle Physics, Dark Energy and Dark Matter, Supersymmetry, Quantum Field Theory II, Advanced Topics in Field Theory