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 phase 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

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

Blue skies *(curiosity-driven, my pet projects)*

Current Projects

Kontsevich-Soibelman invariant, moduli space of curves

Ads/CFT conjecture, Hawking-Page phase transition, and Hilbert-Pólya conjecture

Past Projects

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

A Consistency Verification of Extended Theories of Gravitation

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

Derive Atiyah-Singer Index Theorem - by using six distinct approches

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

Kontsevich-Soibelman Wall-Crossing Formula, and generalized Donaldson-Thomas Invariants

Self-Driving Cubes on A Möbius Strip (using C++, started from scratch, without using any existed Neural Network libraries)

Teaching

Past Projects

San Francisco Math Circle, Fall 2016

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

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, and NDHU 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

Conferences, Workshops, and Courses Attended

MIT ProfessionalX 6.BDx Honor Code Certificate for Tackling the Challenges of Big Data. Developed by the faculty of the MIT Computer Science and Artificial Intelligence Laboratory in collaboration with MIT Professional Education and edX (March 2015)

Summer school on Topological Insulator and Spintronics (2013)

Dynamic Days Asia Pacific (DDAP) 7 — The 7th International Conference on Nonlinear Science (August 5, 2012)

Summer School on Physics and Mathematics of Symmetry, National Taiwan University (2012)

Towards Ultimate Understanding of the Universe: First LeCosPA Symposium (February 6-9, 2012)

Winter School: Anthony Zee's Lectures on Quantum Field Theory, Academia Sinica, Taiwan (2011)

Summer School on Theoretical Physics, National Tsinghua University (2009)

Course Projects

A Mini Course Project: Two Approches to Understand Gravitational Lensing

Pong Game, using C++, and Ogre3D

Linked List Assignment: Playing with Sound (in Java)

Huffman Coding

Persistent Data Structures (BST and Stack)

Dijkstra, Binomial Heaps, Hash Tables, and More!

Volunteer

Past Projects

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

Google San Francisco Bay Area CS-First Program, (Summer 2016)

Awards

Awarded 2004 First prize and 2003 Second prize in National Science and Engineering Fair in Taiwan

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