

ANDY CHEN



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EDUCATION

University of Michigan, Ann Arbor

Ann Arbor, MI

2018 — Present

Ph. D. Candidate in Physics and Scientific Computing (Joint Program)

Georgia Institute of Technology

Atlanta, GA

2014 — 2018

B. Sc. in Physics, *Highest Honor*

Minor in Mathematics (Analysis) and Music Performance (Percussion)

RESEARCH EXPERIENCE

UM Department of Physics

Ann Arbor, MI

Lab Manager | *ATLAS BIS Small Muon Drift Tube Construction*

February 2021 — Present

- Oversaw construction, logistics, and QA of 30000+ sMDT electronics and performance
- Guided 4 undergraduate students through a 4-month hands-on summer research experience
- Organized task schedules for lab assistants and ensured proper lab training and safety
- Built and maintained MS Access database for storing sMDT equipment logistics and results

Reference: Drs. Bing Zhou & Claudio Ferretti

CERN ATLAS Collaboration

Meyrin, Switzerland

Software Maintainer | *Higgs to Gamma Analysis Toolkit Upgrade*

January 2021 — Present

- Rebuilt HGam source code for new (latest) analysis framework release compatibility
- Integrated newly developed physics analysis tools into existing source code
- Resolved issues and requests within ATLAS HGam analysis group of 40+ users

Reference: Drs. Anthony Morley & Chen Zhou

UM Department of Physics

Ann Arbor, MI

Graduate Researcher | *ATLAS Exotic Higgs to Diphoton Analysis*

May 2019 — Present

- Created and performed efficiency studies on MC datasets to optimize sensitivity
- Increased discriminating power between data categories using ML methods
- Reconstructed data modeling method to C++ for code base framework compatibility
- Refined curve fitting techniques for increase of up to 28% in robustness and sensitivity

Reference: Drs. Dante Amidei & Christopher R. Hayes

CERN ATLAS Collaboration

Meyrin, Switzerland

Graduate Researcher | *ATLAS New Small Wheel Integration & Commissioning*

January 2020 — December 2020

- Coordinated with engineering teams to assemble muon detector electronics and hardware
- Tested and diagnosed PCBs to assess circuitry health and minimize electronic noise
- Improved time efficiency of electronics noise data collection and analysis by 33%
- Managed electronics reception, readout, and issue tracking with CERN Oracle database

Reference: Drs. Liang Guan & Siyuan Sun

RESEARCH EXPERIENCE (CONT.)

GT School of Physics, Center for Nonlinear Science

Atlanta, GA

Undergraduate Researcher | Search for Periodic Orbits

August 2017 — December 2017

- Researched and manipulated Kuramoto-Sivashinsky and Michelson ODEs
- Redesigned hyperparameter scanning programs to solve KS in Fourier space

Reference: Dr. Predrag Cvitanović

SLAC National Accelerator Laboratory

Menlo Park, CA

SULI Intern | TCSPC for Electron Bunch Measurement

June 2017 — August 2017

- Designed monitoring program to interface with photon counting instrument
- Implemented methods to reduce instrumentation error in TCSPC data
- Developed EPICS display and control panel for maintaining SPEAR3 electron beam

Reference: Dr. Jeff Corbett

Lawrence Livermore National Laboratory

Livermore, CA

HEDP Intern | Thermodynamic Modeling of Energetic Materials

May 2016 — August 2016

- Extended Peng-Robinson Equation of State to various energetic materials
- Designed thermodynamics simulation programs to develop pure and mixture models

Reference: Dr. Philip C. Myint

Parker H. Petit Institute for Bioengineering & Bioscience

Atlanta, GA

Undergraduate Researcher | Ionic Liquids for Topical Drug Delivery

January 2015 — December 2015

- Synthesized ionic liquids that incorporate active pharmaceutical ingredients
- Prepared experiments to measure properties of ionic liquids and their alternatives
- Increased the topical absorption of non-steroidal anti-inflammatory drugs
- Developed research plan and procedure for antifungal drugs as new project

Reference: Dr. Wilmarie M. Ramos

PUBLICATIONS

ATLAS Collaboration. Search for resonances decaying into photon pairs in 139 fb^{-1} of pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector. 2021.

Andy Chen. TCSPC monitoring of SPEAR3 electron beam via EPICS. *SULI Report*, 2017.

Andy Chen, Tammie Tuyet Nhi Huynh, Aritro Majumdar, and Birgit Musheno. *Origanum vulgare* subsp. *hirtum* glyceraldehyde-3-phosphate dehydrogenase-like (gapc) gene, partial sequence. *NCBI GenBank Nucleotide Database*, 2013.

Bofan Xu, Eduardo Carranza, **Andy Chen**, Shantha Condamoor, and Jeff Corbett. Electron bunch pattern monitoring via single photon counting at SPEAR3. *IBIC17, Lansing, MI*, 2017.

PROJECTS

Multi-Objective RL in COVID Policy Making

Ann Arbor, MI

Reinforcement Learning Theory: Course Final Project

September 2020 — December 2020

- Adapted (G)SIR Dynamic Model to simulate case counts in Michigan population
- Optimized lockdown strategy using multi-objective RL
- Performed Pareto-optimal analysis to balance economical and societal costs

Github: [nik7273/covid-pgmorl](https://github.com/nik7273/covid-pgmorl)

Flash Point Workout

Chandler, AZ

Personal Project

September 2020 — Present

- Created customizable and automated workout session web interface with TTS
- Rendered animations for exercise demonstrations using Blender

Webapp: www.flashpointworkout.com

Gitlab: [andyzfchen/flash-point-workout](https://gitlab.com/andyzfchen/flash-point-workout)

WORK EXPERIENCE

Numerade

Los Angeles, CA

Online Educator (Remote)

January 2020 — May 2020

- Created online instructional videos for homework and conceptual assistance

UM Rackham Graduate School

Ann Arbor, MI

Graduate Student Instructor

September 2018 — December 2019

- Prepared mini-lectures for lab experiments and discussion sessions
- Set up and instructed engineering physics lab classes
- Provided feedback and resources for lab reports, homeworks, and exam preparation
- Assisted undergraduates with homework and review with physics and math courses

Self Employment

Ann Arbor, MI

Private Tutor (Remote & In-Person)

June 2018 — June 2020

- Assisted high school students in math, science, and English classes
- Assisted students in SAT General Exam and AMC 10/12 preparation

SKILLS

Programming Languages, Platforms, & Techniques

Python & PyTorch	UNIX & BASH Scripting	NNs & RL
C++, MATLAB, & Fortran	Git, CI, & Docker	MC Optimization
SQL	CUDA	

Lab Instrumentation and Techniques

TCSPC	Column Chromatography	Recrystallization
Proton NMR	Gas Chromatography	PCR Synthesis
HPLC	Viscometry	Electrophoresis
IR Spectroscopy	Fractional Distillation	Protein Blotting

Familiar Topics

Classical Mechanics	Particle Physics	Abstract Algebra
Electrodynamics	Radiation Physics	Real Analysis
Quantum Mechanics	Optics	Complex Analysis
Statistical Mechanics	General Relativity	Probability
Thermodynamics	Special Relativity	Bayesian Statistics
Quantum Field Theory	Cosmology	Frequentist Statistics
	Organic Chemistry	Differential Geometry

Communication

English	Native Proficiency
Mandarin Chinese	Minimum Professional Proficiency
French	Elementary Proficiency

**FELLOWSHIPS,
SCHOLARSHIPS, &
AWARDS**

University of Michigan Physics Graduate Fellowship (2018)

Graduate Fellowship awarded by the Physics Department in recognition of outstanding undergraduate accomplishments.

Hitohiro Fukuyo Physics Scholarship (2018)

Physics Scholarship awarded to students whose achievements and character reflect Dr. Fukuyo's intellectual accomplishments and personal integrity.

Kelley Family Music Scholarship (2016, 2017)

Music Scholarship awarded upon recommendation by the Music Department to undergraduate students participating in the Georgia Tech music program.

President's Undergraduate Research Award (2015)

Competitive awards funding undergraduate students conducting research with a Georgia Tech faculty member or Georgia Tech Research Institute scientist.

Phoenix Youth Symphony Young Musician's Competition (2014)

Music Camp Scholarship awarded to first and second place recipients of each instrument division of the Concerto Competition.

**LEADERSHIP
EXPERIENCE**

Friends In Deed

Ypsilanti, MI

Demo Instructor

January 2019 — December 2019

- Demoed science experiments to underprivileged kids to stimulate interest in STEM

Georgia Tech China Care Club

Atlanta, GA

Treasurer

May 2017 — May 2018

- Documented the expenditures and managed the budget for all club activities
- Crafted and submitted bills and grant proposals to various funding groups
- Oversaw responsibilities and needs of Fundraising Coordinator and Social Chair

Co-Fundraising Coordinator

January 2015 — May 2015, May 2016 — May 2017

- Coordinated fundraisers that sponsor orphaned children from One Sky Foundation
- Aided Treasurer in applying for funding from the Student Government Association

Historian

May 2015 — May 2016

- Recorded club events and activities on social media to spread club awareness
- Collaborated with other committee members in the planning of large events

Georgia Tech Yellow Jacket Archery Club

Atlanta, GA

Historian

May 2016 — December 2016

- Maintained records of shooting scores and progress of club members
- Documented club events and activities for advertising and recruitment initiatives

Secretary

May 2015 — May 2016

- Managed membership, minutes and records, attendance, and announcements
- Organized club social, recruitment, and advertising initiatives
- Provided coaching and instruction as a Level 2 NTS certified instructor