Sanha Cheong | Curriculum Vitae

Physics Department, Stanford University – Stanford, CA

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Education

Stanford University — **Stanford, CA**
Ph.D. in Physics (Adviser: Ariel Schwartzman) — *September 2017 – Present*
- Working on the ATLAS experiment at the SLAC ATLAS Group
- Interested in particle physics, cosmology, and data analysis including machine learning

University of Rochester — **Rochester, NY**
B.S. in Physics & Astronomy (Highest Distinction), B.A. in Mathematics — *Class of 2017*
- Overall GPA: 3.92/4.00, major GPA 3.99/4.00, elected to Phi Beta Kappa (ΦBK)
- International Baccalaureate Scholarship, $16k per year

Yew Chung International School of Shanghai — **Shanghai, China**
International Baccalaureate (IB) Diploma — *Class of 2013*
- Total of 8 IB subjects including Further Mathematics, Higher-level Physics, Chemistry, and Economics

Research Interests

Experimental particle physics, phenomenology, cosmology, machine learning, and algorithms
Higgs, long-lived particles (LLP), QCD and jet physics, dark matter, supersymmetry, BSM, early-stage universe, dark energy, baryon acoustic oscillations, large-scale structures, neural networks, deep learning in physics, data analysis algorithms

Research Activities

SLAC ATLAS Group — **Menlo Park, CA**
Graduate Research Assistant — *August 2017 – Present*
- Simulation & trigger studies for LLP searches using timing information at the HL-LHC
- ATLAS hardware upgrade: ITk, RD-53 read-out, testing, calibration, etc.
- Machine learning techniques in particle physics—reconstruction of exotic signatures, neural-network-based jet calibration, etc.

University of Rochester — **Rochester, NY**
Undergraduate Research Assistant (Adviser: Prof. Regina Demina) — *November 2015 – May 2017*
- Studies of baryon acoustic oscillations using SDSS-III BOSS data
- Development of a novel analysis algorithm accelerating the computation of galaxy 2-point correlation functions with an alternative background-subtraction method

Research Publications

1. R. Demina, **S. Cheong**, S. BenZvi, O. Hindrichs. "A Computationally Efficient Approach for Calculating Galaxy Two-point Correlations." *Monthly Notices of the Royal Astronomical Society*, Vol. 480, Issue 1, p. 49-56, sty1812, October 2018.

Oral & Poster Presentations

1. **S. Cheong**. "Introduction to Deep Learning for Mathematicians by a Physicist (Capabilities of Neural Networks: Mathematical and Empirical Perspectives)." *Department of Mathematics Graduate Seminars*, Sogang University, Seoul, South Korea, July 16, 2018.
2. **S. Cheong**, J. Pearkes, A. Cukierman. "Merged Di-photon Identification for the ATLAS Experiment at the Large Hadron Collider." *CS 231N Project Poster Session, Spring 2018*, Stanford, CA, June 12, 2018.
3. **S. Cheong**. "Modification to the Calculation of a Two-point Correlation Function." *APS April Meeting 2017 (Q2C: Quarks to Cosmos)*, Washington, DC, January 28-31, 2017.
4. **S. Cheong**. "Introduction to Baryon Acoustic Oscillations (BAO)." *University of Rochester Summer REU Presentation*, Rochester, NY, August 5, 2016.

Schools & Workshops Attended

1. *US ATLAS Hadronic Final State Forum 2018*, Berkeley, CA, December 10 - 14, 2018
2. *APS Bridge Program and National Mentoring Community Conference*, Google Sunnyvale Campus & Stanford University, CA, November 16 - 18, 2018
3. *46th SLAC Summer Institute (The Standard Model at 50: Successes & Challenges)*, Menlo Park, CA, July 30 - August 10, 2018

Teaching Experiences

- **Stanford University** **Stanford, CA**
  Teaching Assistant
  - PHYSICS 152/252, Introduction to Particle Physics, Spring 2019
  - PHYSICS 166/266, Statistical Methods in Experimental Physics, Winter 2019
  - PHYSICS 41, Mechanics, Winter 2018

  Teaching Mentor, *Vice Provost for Teaching & Learning* *June 2018 – Present*
- **University of Rochester** **Rochester, NY**
  Teaching Assistant
  - PHY 227 Thermodynamics & Statistical Mechanics, Spring 2017
  - PHY 142 Electricity & Magnetism (Honors), Fall 2016
  - PHY 143 Waves and Modern Physics (Honors), Spring 2016
  - PHY 122 Electricity & Magnetism, Fall 2015

- MTH 172 Honors Calculus II, Spring 2015
- MTH 171 Honors Calculus I, Fall 2014

Physics GRE Tutor, *Society of Physics Students (SPS) UR Chapter* *August 2016 – May 2017*

Leadership & Representative Positions

- **Stanford University** **Stanford, CA**
  Recruitment Chair, *Graduate Students in Applied Physics & Physics (GSAPP)* *June 2018 – Present*
  First-year Mentoring Chair, *GSAPP* *June 2018 – Present*
  SASS Czar (Organizer), *SLAC Association for Student Seminars* *June 2018 – Present*
- **University of Rochester** **Rochester, NY**
  Business Manager, *SPS UR Chapter* *June 2016 – May 2017*
  Student Representative, *Physics & Astronomy Undergraduate Curriculum Committee* *September 2016 – May 2017*

Advising, Outreach, and Other Services

- **Stanford University** **Stanford, CA**
  Graduate Coordinator, *Physics Undergraduate Summer Research* *June 2018 – August 2018*
  Graduate Research Mentor, *Stanford Undergraduate Research Association* *January 2018 – Present*
- **University of Rochester** **Rochester, NY**
  Alumni Interviewer, *Office of Admissions* *November 2017 – Present*
  Peer Adviser, *College Center for Advising Services* *August 2016 – May 2017*

Awards and Such

1. Janet Fogg Prize. *University of Rochester*, May 2017.
2. Excellence in Undergraduate Teaching. *University of Rochester*, May 2017.

Professional Memberships

American Astronomical Society (AAS)
American Physical Society (APS)
Phi Beta Kappa (ΦBK)
Society of Physics Students (SPS)
Sigma Pi Sigma (ΣΠΣ)

Computer & Hardware Skills

Data Analysis

- Experiences in big data analysis for physics & astronomy research
- Developing new statistical analysis algorithms and applying machine learning techniques

Programming Languages

- Python, C, C++, ROOT, Java, Mathematica
- UNIX shell (bash) scripting

Document Editing and Productivity Software

- LaTeX
- GitHub, Microsoft Office, Google Docs
- Basic web-design using HTML, CSS, Javascript, and Jekyll

Hardware Skills

- Radioactivity work training
- Basic machine shop training, circuit design (Protel DXP), printed circuit boards

Languages

English (fluent), Korean (fluent), Mandarin (conversational)

Citizenship

Republic of Korea