

Yaofu Zhou, PhD

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An active open-source developer focusing on simulations for the aerospace industry. With a diverse technical depth in simulation, space, aviation, and physics; and acute awareness of space policy issues. Co-developer of a primary simulation framework for Higgs Boson physics at the Large Hadron Collider. Experienced airplane pilot under instrument training. Enthusiastic to contribute to the aerospace industry with first principle thinking, rapid adaptability, and problem solving.

Education

The George Washington University, Elliott School of International Affairs Washington, DC
MA, International Science & Technology Policy December 2022

Concentration: Space Policy

Relevant Coursework: Orbital Mechanics and Spacecraft Dynamics | Spacecraft Design | Space Policy | Space Law | Space Economy | Space and National Security | Science and Technology Policy Analysis | Science, Technology and National Security | Patent Law for Engineers

The Johns Hopkins University Baltimore, MD
PhD, Physics May 2019

Field of Study: Phenomenological High Energy Physics

Relevant Coursework: Advanced Electrodynamics | Statistical Mechanics | Advanced Quantum Mechanics | Quantum Field Theory | General Relativity | Language of Astrophysics

Illinois Institute of Technology Chicago, IL
BS, Physics May 2011

Relevant Coursework: Computational Physics | Computational Science | Mathematics for Theoretical Physics | Fourier Series and Boundary-Value Problems | Analytical Dynamics | Classical Mechanics | Thermodynamics

Experience

Intelligent Aerospace Systems Lab, The George Washington University Washington, DC
Graduate Research Associate September 2020 – Present

- Open-source development for air and space traffic simulation platform, mainly based on [BlueSky](#).
- Initiated projects of adding fidelity and 3D components to *BlueSky*, an open-source air traffic simulation platform hosted at the Delft University of Technology, motivated by industrial needs of scenario modeling and risk analysis.
- Organized discovery flights for research colleagues by personally flying them to the busiest airspaces in the U.S. to convey real-life challenges that could be neglected in theoretical and academic studies.

Department of Physics, Missouri University of Science & Technology Rolla, MO
Visiting Scholar March 2019 – February 2020

- Investigation of prospects of U.S.-China exchange in big science with the primary outcome being an in-depth policy-oriented case study on the Circular Electron-Positron Collider proposed by the Chinese particle physics community.

Projects

Technical:

Open-Source Extensions for *BlueSky*, an Air Traffic Simulator September 2020 – Present

- Motivated by industrial needs and over 300+ hours of real-life airplane piloting experience.
- Independently implemented the features of magnetic heading, 3D terrain, and the associated functionalities.
- Actively developing elements of the space environment, traffic, activities, and anomalies for *BlueSky* for future scenario modeling and risk analysis.

JHUGen Event Generator Framework for Higgs Boson Physics January 2013 – March 2019

- Co-developed [JHUGen](#), a primary simulation framework for Higgs Boson physics at the Large Hadron Collider (LHC).
- As of 2022, *JHUGen* has enabled at least 24 published measurements and analyses of the Higgs Boson and 35 Physics Analysis Summaries (internal notes) by the CMS Collaboration.

JHUGen Event Generator Framework for Higgs Boson Physics (Continued)

- Invented one of the best methods to date in measuring some of the Higgs Boson properties at the LHC.

Policy:

A Scenario Analysis on the Supply Chain of Cobalt in the Democratic Republic of Congo August 2021 – May 2022

- Clearly demonstrated the urgency to address the soon-to-be overstressed international cobalt supply chain with scenario analysis of the global demand for cobalt in meeting the climate goals.
- Capstone project for MA degree in International Science and Technology Policy.

Beyond Science of Circular Electron-Positron Collider (CEPC) in China March 2019 – February 2020

- Analyzed and presented the policy-related opportunities and challenges by the CEPC proposal to the international particle physics community and to stakeholder countries including particularly the United States and China.
- Compiled the most comprehensive report on the status and outlook of the CEPC project to date.

Publications

Andrei V. Gritsan, Jeffrey Roskes, Ulascan Sarica, Markus Schulze, Meng Xiao, and **Yaofu Zhou**, New features in the JHU generator framework: constraining Higgs boson properties from on-shell and off-shell production, *Phys. Rev. D* 102, 056022 (2020), [arXiv:2002.09888](https://arxiv.org/abs/2002.09888) [hep-ph]

Yaofu Zhou, Probing Anomalous Couplings of the Higgs Boson to Weak Bosons and Fermions with Precision Calculations, PhD thesis, [CERN-THESIS-2019-007](https://arxiv.org/abs/1907.0007) (2019)

Yaofu Zhou, Constraining the Higgs Boson Coupling to Light Quarks in the $H \rightarrow ZZ$ Final States, *Phys. Rev. D* 93, 013019 (2016), [arXiv:1505.06369](https://arxiv.org/abs/1505.06369) [hep-ph]

S. Dawson, Andrei Gritsan, [and 132 others, including **Yaofu Zhou**], Higgs Working Group Report of the Snowmass 2013 Community Planning Study, (2013), [arXiv:1310.8361](https://arxiv.org/abs/1310.8361) [hep-ex]

Ian Anderson, Sara Bolognesi, Fabrizio Caola, Yanyan Gao, Andrei V. Gritsan, Christopher B. Martin, Kirill Melnikov, Markus Schulze, Nhan V. Tran, Andrew Whitbeck, **Yaofu Zhou**, Constraining anomalous HVV interactions at proton and lepton colliders, *Phys. Rev. D* 89, 035007 (2014), [arXiv:1309.4819](https://arxiv.org/abs/1309.4819) [hep-ph]

John Freeman, Thomas J. Phillips, Vadim Rusu, Jake Whitaker, **Yaofu Zhou**, Anomalous Coupling Limits from Z gamma Production Combining Electronic and Muonic Channels in 5/fb, CDF Note 10043 (2010), Fermi National Accelerator Laboratory Archive

Yaofu Zhou, Quantum Communication: Setup, Status, and Outlook, Pending Publication (2022)

Yaofu Zhou, Climate Goal, Electrification, and the Stress on the Cobalt Supply Chain from the Democratic Republic of Congo, Capstone Report for MA degree in International Science and Technology Policy, Pending Publication (2022)

Skills and Qualifications

Core Competencies: Computer Simulation | Physics | Monte Carlo Methods | National Airspace System | Orbital Mechanics | Aeronautical Decision-Making | Aerospace Risk Management | Aviation Regulations | Science and Technology Policy

Applications and Programing Languages: Python (Proficient) | Mathematica (Proficient) | Fortran (Expert) | C/C++ (Competent) | SQL (Proficient) | Maple (Competent) | Satellite Tool Kit (Advanced Beginner) | Microsoft Office Suite (Word, Excel, PowerPoint, Access) (Expert) | Open Topography (Advanced Beginner) | OpenStreetMap (Advanced Beginner) | LaTeX (Proficient) | IBM SPSS (Competent) | Final Cut Pro (Proficient)

Certificates: *Federal Aviation Administration:* Airplane Private Pilot | *Federal Aviation Administration:* Part 107 Small Unmanned Aircraft System Remote Pilot | *The American Institute for Avalanche Research and Education:* Level 1 | *Professional Ski Instructors of America:* Alpine Skiing Level 1 | *CITI Program:* Conflicts of Interest, Export Compliance, Social & Behavioral Research, Social and Behavioral Responsible Conduct of Research