Zach Gillis

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Education

University of Chicago — Chicago, IL
B.S. Physics with Honors, B.S. Mathematics — *Sept. 2021 – June 2025*
- GPA: 3.85/4.00

Walter Payton College Preparatory High School — Chicago, IL
High School Diploma — *Sept. 2017 – June 2021*
- GPA: 4.00/4.00
- SAT: 1580

Research Experience

Research Assistant — July 2023 – June 2025
University of Chicago, Department of Physics (with Prof. Young-Kee Kim) — *Chicago, IL*
- Worked in UChicago's arm of the ATLAS experiment at CERN's Large Hadron Collider
- Developed distributed computing framework to run Higgs pair production Monte Carlo simulations (with POWHEG)
- Co-authored paper placing novel constraints on quartic Higgs self-coupling from inclusive cross section
- Set first expected constraints on quartic Higgs self-coupling from $HH \to bb\tau\tau$ analysis in LHC Run 2 for bachelor's thesis

Summer Research Intern — June 2024 – Aug. 2024
Stanford SLAC National Accelerator Laboratory (with Prof. Caterina Vernieri) — *Menlo Park, CA*
- Worked on the ATLAS experiment with SLAC and Stanford faculty
- Completed trigger efficiency analysis of VBF-produced Higgs decaying into bottom/anti-bottom or charm/anti-charm pairs (VBF $H \to bb/cc$)
- Presented work to SLAC ATLAS group and VBF $H \to bb/cc$ analysis group in ATLAS

Research Assistant — Oct. 2022 – Aug. 2024
University of Chicago, Pritzker School of Molecular Engineering (with Prof. Tian Zhong) — *Chicago, IL*
- Worked in lab focused on quantum engineering, including quantum transduction and rare-earth doped material platforms
- Designed microwave and optical cavities for magneto-optic quantum transduction to enable quantum networking

Summer Research Intern — June 2022 – Aug. 2022
National Radio Astronomy Observatory — *Charlottesville, VA*
- Selected to REU focused on radio astronomy, radio telescope design, astrophysics, and astrochemistry
- Completed project enabling reduction in required computing resources for the Next Generation VLA (ngVLA)
- Co-authored ngVLA computing memo analyzing averaging techniques with focus on achieving ngVLA science use cases

Summer Research Intern — June 2021 – Aug. 2021
Northwestern University, Lurie Cancer Center — *Chicago, IL*
- Selected to research internship program focused on cancer research and bioinformatics
- Completed a project using R on exercise-induced gene expression and resulting pathway perturbations
- Presented project at research symposium and awarded best poster among 27 ResearcHStart participants

Publications

Bizoń, W., Haisch, U., Rottoli, L., Gillis, Z., Moser, B., & Windischhofer, P. — Feb. 2024
"Addendum to: Constraints on the quartic Higgs self-coupling from double-Higgs production at future hadron colliders."
Journal of High Energy Physics, vol. 2024, no. 2, https://doi.org/10.1007/JHEP02(2024)170.

Steeb, J.W. & Gillis, Z. — May 2023
"Time Averaging Limits and Baseline Dependent Averaging for the ngVLA."
Next Generation Very Large Array Computing Memo Series, https://library.nrao.edu/public/memos/ngvla/NGVLAC_08.pdf.

Selected Presentations

"Determining Trigger Efficiency of VBF Higgs to Bottom/Charm Background Events." — Aug. 2024
SLAC Summer Undergraduate Laboratory Internship Colloquium

"Cubic and Quartic Higgs Self-Coupling Parameterizations of Di-Higgs Production at Next-to-Leading Order." — April 2024
APS April Meeting

"Designing a Microwave Cavity to Enable Magneto-Optic Transduction in Quantum Networking." — April 2023
University of Chicago Undergraduate Research Symposium

"Utilizing Baseline-Dependent Averaging in the ngVLA." — Sept. 2022
National Radio Astronomy Observatory Summer Assistantship Colloquium

"Post-Exercise Regulation of the AP-1 Transcriptional Program." — Aug. 2021
ResearcHStart Summer Symposium