# Brian C. **Seymour**

PHYSICIST
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*Research interests: general relativity, tests of modified gravity theories, and gravitational waves.*

## Education

**California Institute of Technology** — *Pasadena, California*
PHD IN PHYSICS — *Aug. 2020 –*
- Advised by Yanbei Chen

**University of Cambridge** — *Cambridge, UK*
PART III OF THE MATHEMATICAL TRIPOS, DEPARTMENT OF APPLIED MATHEMATICS AND THEORETICAL PHYSICS — *Oct. 2019 - May. 2020*
- Churchill Scholar

**University of Virginia** — *Charlottesville, Virginia*
B.S. IN PHYSICS AND MATHEMATICS — *Aug. 2016 - May. 2019*
- With highest distinction, GPA 3.96.

## Experience

**Researcher** — *Pasadena, California*
CALTECH — *Oct. 2020 -*
- Cosmology with gravitational waves, testing general relativity, black hole perturbation theory, and space based gravitational wave detectors with Yanbei Chen

**Undergraduate Researcher** — *Charlottesville, Virginia*
UNIVERSITY OF VIRGINIA — *Oct. 2017 - Aug. 2019*
- Astrophysical tests of general relativity with Kent Yagi

**Summer Undergraduate Research Fellow** — *Livingston, Louisiana*
LIGO LIVINGSTON — *June. 2017 - Aug. 2017*
- Analyzed angular controls systems noise at LIGO with Marie Kasprzack, Adam Mullavey, and Arnaud Pele.

# Publications

Published

[1] A. Laeuger, **B. Seymour**, Y. Chen, and H. Yu. Measuring supermassive black hole properties via gravitational radiation from eccentrically orbiting stellar mass black hole binaries. *Phys. Rev. D* 109 (2024) 6, 064086. arXiv:2310.16799.

[2] A. Laeuger, **B. Seymour**, Y. Chen, and H. Yu. Measuring supermassive black hole properties via gravitational radiation from eccentrically orbiting stellar mass black hole binaries. *Phys. Rev. D* 109 (2024) 6, 064086. arXiv:2310.16799.

[3] **B. Seymour**, H. Yu, and Y. Chen. Multiband Gravitational Wave Cosmography with Dark Sirens. *Phys. Rev. D* 108 (2023) 4, 044038. arXiv:2208.01668.

[4] H. Yu, **B. Seymour**, Y. Wang, and Y. Chen. Uncertainty and bias of cosmology and astrophysical population model from statistical dark sirens. *Astrophys. J.* 941 (2022) 2, 174. arXiv:2206.09984.

[5] H. Yu, Y. Wang, **B. Seymour**, and Y. Chen. Detecting gravitational lensing in hierarchical triples in galactic nuclei with space-borne gravitational-wave observatories. *Phys. Rev. D* 104 (2021) 10, 103011. arXiv:2107.14318.

[6] **B. Seymour** and K. Yagi. Probing Massive Scalar/Vector Fields with Binary Pulsars. *Phys. Rev. D* 102 (2020) 10, 104003. arXiv:2007.14881.

[7] **B. Seymour** and K. Yagi. Probing Massive Scalar Fields from a Pulsar in a Stellar Triple System. *Class. Quant. Grav.* 37 (2020) 14, 145008. arXiv:1908.03353.

[8] Z. Carson, **B. Seymour** and K. Yagi. Probing Massive Future Prospects for Probing Scalar-Tensor Theories with Gravitational Waves from Mixed Binaries. *Class. Quant. Grav.* 37 (2020) 6, 065008. arXiv:1907.03897.

[9] **B. Seymour** and K. Yagi. Testing General Relativity with Black Hole-Pulsar Binaries. *Phys. Rev. D* 98 (2018) 12, 124007. arXiv:1808.00080.

# Honors & Awards

2020 **NSF Graduate Research Fellowship** *Cambridge, UK*
Graduate school funding

2019 **Stephen T. Thornton Outstanding Undergraduate Physics Research Award** *Charlottesville, VA*
Annual prize for the best physics undergraduate research project at UVA

2019 **Phi Beta Kappa** *Charlottesville, VA*
Collegiate honor society

2019 **Churchill Scholarship** *Charlottesville, VA*
Scholarship for a master's degree at University of Cambridge

2018 **Astronaut Scholarship** *Charlottesville, VA*
National tuition scholarship for scientific research achievement

2018 **College Council Fall Semester Scholars Grant** *Charlottesville, VA*
Research grant funding from UVA College Council.

2018 **Mitchell Summer Research Scholarship,** *Charlottesville, VA*
Summer research stipend from UVA Physics Department

2018 **College Science Scholar Summer Research Stipend** *Charlottesville, VA*
Summer research stipend through College Science Scholar Program

2017 **Shire Award for Collegiate Education Scholarship** *Charlottesville, VA*
Selective national tuition scholarship for academic performance

2016 **College Science Scholar,** *Charlottesville, VA*
Admitted to UVA program based on scientific research achievement.

2014 **Eagle Scout** *Charlottesville, VA*
Highest award offered in Boy Scouts of America for leadership and community service.

## Presentations

Apr. 2024 B. Seymour and Y. Chen. “Constraining Nonviolent Nonlocality by Stacking Gravitational Wave Events,” American Physical Society April Meeting. Sacramento, CA. (Oral)

Mar. 2024 B. Seymour and Y. Chen. “Searching for Nonviolent Nonlocality in LIGO,” LIGO-Virgo-Kagra Meeting. Baton Rouge, LA. (Poster)

Mar. 2024 B. Seymour and Y. Chen. “Detectability of Nonviolent Nonlocality with LIGO,” 40th Pacific Coast Gravity Meeting. Santa Barbara, CA. (Oral)

Apr. 2023 B. Seymour and Y. Chen. “Probing the Effects of Nonviolent Nonlocality with Gravitational Waves,” American Physical Society April Meeting. Minneapolis, MN. (Oral)

Mar. 2023 B. Seymour and Y. Chen. “Probing the Effects of Nonviolent Nonlocality with Gravitational Waves,” 39th Pacific Coast Gravity Meeting. Pasadena, CA. (Oral)

Apr. 2022 B. Seymour, H. Yu, and Y. Chen. “Multi-band Gravitational Wave Cosmography with Dark Sirens,” American Physical Society April Meeting. New York, NY. (Oral)

Mar. 2022 B. Seymour, H. Yu, and Y. Chen. “Multi-band Gravitational Wave Cosmography with Dark Sirens,” 38th Pacific Coast Gravity Meeting. Davis, CA. (Oral)

Apr. 2019 B. Seymour, and K. Yagi. “Black Hole-Pulsar Binary Tests of Gravity,” American Physical Society April Meeting. Denver, CO. (Oral)

Nov. 2018 B. Seymour, and K. Yagi. ”Testing General Relativity with Black Hole-Pulsar Binaries,” Society of Physics Students 8th Annual Undergraduate Physics Research Symposium. Charlottesville, VA. (Oral, 2nd place)

Nov. 2018 B. Seymour, and K. Yagi. “Testing General Relativity with Black Hole-Pulsar Binaries,” Gravity Group Meeting. Charlottesville, VA. (Oral)

Oct. 2018 B. Seymour, and K. Yagi. ”Testing General Relativity with Black Hole-Pulsar Binaries,” Fall College Science Scholar Symposium. Charlottesville, VA. (Poster)

Aug. 2018 B. Seymour, and K. Yagi. “Testing General Relativity with Black Hole-Pulsar Binaries,” Astronaut Scholarship Foundation Technical Conference. Washington DC. (Oral)

Nov. 2017 B. Seymour, M. Kasprzack, A. Pele, and A. Mullavey. “Non-Linear Angular Noise Coupling into Differential Arm Length,” UVa Sigma Pi Sigma Symposium. Charlottesville, VA. (Oral)

Aug. 2017. B. Seymour, M. Kasprzack, A. Pele, and A. Mullavey. “Characterization of Nonlinear Angular Noise Coupling into Differential Arm Length of the LIGO Livingston Detector,” LIGO SURF Session. Pasadena, CA. (Oral)

Nov. 2016 B. Seymour, O. Cypull, C. O’Dea, S. Cheng, and K. Feitosa. “Stress Induced Rearrangements in a Bubble Raft,” SESAPS Conference. Charlottesville, VA. (Oral)

Oct. 2016 B. Seymour, O. Cypull, C. O’Dea, S. Cheng, and K. Feitosa. “Interfacial Bubble Deformations,” UVa Sigma Pi Sigma Symposium. Charlottesville, VA. (Poster)

Aug. 2016 B. Seymour, O. Cypull, S. Cheng, and K. Feitosa. “Stress Induced Rearrangements in a Bubble Raft,” JMU Summer Symposium. Harrisonburg, VA. (Oral)

Mar. 2016 B. Seymour, O. Cypull, S. Cheng, and K. Feitosa. “Interfacial Bubble Deformations,” 83rd Annual American Physical Society March Meeting. Baltimore, MD. (Poster)

Nov. 2015 B. Seymour, O. Cypull, and K. Feitosa. “Interfacial Bubble Deformations,” Third Annual Virginia Soft Matter Workshop. Charlottesville, VA. (Oral)

Aug. 2015 B. Seymour, O. Cypull, S. Cheng, and K. Feitosa. “Bubble Deformations at the Air-Water Interface,” JMU Summer Symposium. Harrisonburg, VA. (Oral)

## Workshops

2019 **Kavli RISE Summer School on Gravitational Waves**
Summer school discussing current research in gravitational waves for graduate students.

## Skills

**Programming** Python, Julia, Java, C++, Matlab, Mathematica, BASH, and Interactive Data Language (IDL)
**Physics Software** LaTeX, ROOT, ImageJ, XMGrace, and Igor Pro