# Grant Newton Remmen — Curriculum Vitae


**Contact Information**

**Center for the Fundamental Law of Nature**
**Department of Physics**
**Harvard University**

*e-mail:* gremmen@fas.harvard.edu
*web:* grantremmen.com


**Positions**

**Harvard University**, Research Associate — 2026–present

**New York University**, James Arthur Postdoctoral Fellow — 2023–2026

**University of California, Santa Barbara**, Fundamental Physics Fellow — 2020–2023
**Kavli Institute for Theoretical Physics**, Postdoctoral Scholar

**University of California, Berkeley**, Miller Research Fellow — 2017–2020

**Harvard University Society of Fellows**, Junior Fellow (declined) — 2017

**Education**

**California Institute of Technology** — 2012–2017
Ph.D., Physics — June 2017
M.S., Physics — June 2015
Hertz Fellow and NSF Graduate Research Fellow

**University of Minnesota, College of Science & Engineering** — 2008–2012
B.S., Physics, *summa cum laude*, High Distinction, 4.0 GPA — May 2012
B.S., Astrophysics, *summa cum laude*, High Distinction, 4.0 GPA — May 2012
B.S., Mathematics, *summa cum laude*, High Distinction, 4.0 GPA — May 2012

**Selected Honors & Awards**

**Appointed as Finalist Interviewer for Hertz Fellowship** — beginning 2027

**Postdoctoral Research and Professional Development Support Grant**, NYU — 2025

**Appointed as Interviewer for Hertz Fellowship** — 2018–present

**Sakurai Dissertation Award in Theoretical Particle Physics** — 2018
American Physical Society award citation: "For his contributions to understanding the structure and self-consistency of gravity and effective field theories using ideas from quantum field theory and holography."

**Stemple Memorial Prize in Physics**, Caltech — 2016

**United States Delegate to the 66$^{\text{th}}$ Lindau Nobel Laureate Meeting** — 2016

**Hertz Fellow** — 2012–2017

**NSF Graduate Research Fellow**, National Science Foundation — 2012–2017

**Goldwater Scholar** — 2010–2012

**Chambliss Astronomy Achievement Student Award**, — 2011
American Astronomical Society

**Dean's Summer International Student Scholarship**, University College London — 2011

**National Merit Scholar** — 2008–2012

**Byrd Honors Scholar** — 2008–2011

**United States Presidential Scholar**, — 2008
White House Commission on Presidential Scholars & U.S. Dept. of Education

**Scientific & Honorary Affiliations**

American Physical Society
American Astronomical Society
International Society on General Relativity and Gravitation
Sigma Xi, The Scientific Research Honor Society
Sigma Pi Sigma, National Physics Honor Society

PRESS

Phys.Org & NYU News | July 2026
*Physicists Turn to the Universe's "Piano Notes" to Detect Hidden Particles*

Physics Magazine, APS | *Can String Theory Be Explained with No Strings Attached?* June 2026

Popular Mechanics | *Scientists Think They Just Accidentally Proved String Theory* May 2026

Phys.Org | May 2026
*String Theory Is Uniquely Derived from Basic Assumptions About the Universe, Physicists Show*

Caltech News & NYU News | *String Theory Emerges from "Almost Nothing"* May 2026

Science News | *To Get String Theory, You Need Only Four Physics Assumptions* May 2026

Quanta Magazine | *Are Strings Still Our Best Hope for a Theory of Everything?* March 2026

Physics World, IOP, Editor's Choice | January 2025
*String Theory May Be Inevitable as a Unified Theory of Physics, Calculations Suggest*

NYU News | *Physicists 'Bootstrap' Validity of String Theory* December 2024

Phys.org | September 2023
*Theoretical Study Shows That Kerr Black Holes Could Amplify New Physics*

Physics Magazine, APS | *New Physics Magnified in Spinning Black Holes* August 2023

The Current, UCSB | *Quantum Zeta Epiphany* January 2022

Physics Magazine, APS | *A Physical Match for the Riemann Zeta Function* December 2021

Quanta Magazine | May 2020
*Black Hole Paradoxes Reveal a Fundamental Link Between Energy and Order*

PUBLICATIONS

76. **Grant N. Remmen** under review, Phys. Rev. Lett.
*Zeta Functions and the Superstring* arXiv:2606.09977

75. Gary T. Horowitz, Maciej Kolanowski, under review, Phys. Rev. D
**Grant N. Remmen**, Jorge E. Santos arXiv:2605.30411
*Axions Create Singularities on Extremal Horizons*

74. Clifford Cheung, Jaehoon Jeong, Pyungwon Ko, under review, Phys. Rev. Lett.
Alex Pomarol, **Grant N. Remmen**, Francesco Sciotti arXiv:2605.21582
*Multipositivity Constrains the Chiral Lagrangian*

73. Francesco Calisto, Clifford Cheung, **Grant N. Remmen**, under review, Phys. Rev. Lett.
Francesco Sciotti, Michele Tarquini arXiv:2605.20319
*The Equivalence Principle at High Energies Completes the Spectrum*

72. Francesco Calisto, Clifford Cheung, **Grant N. Remmen**, Phys. Rev. Lett. **137** (2026) 071601
Francesco Sciotti, Michele Tarquini arXiv:2604.15423
*Inverse Problem in Effective Field Theory*

71. Ivano Basile, **Grant N. Remmen**, Georgina Staudt Phys. Rev. D **114** (2026) 026001
*Higher-Spin and Higher-Point Constraints on Stringy Amplitudes* arXiv:2603.04485

70. Francesco Calisto, Clifford Cheung, **Grant N. Remmen**, Phys. Rev. D **113** (2026) 106008
Francesco Sciotti, Michele Tarquini arXiv:2512.11955
*Completeness from Gravitational Scattering*

69. Clifford Cheung, **Grant N. Remmen**, Phys. Rev. Lett. **136** (2026) 251601
Francesco Sciotti, Michele Tarquini Editors' Suggestion
*Strings from Almost Nothing* arXiv:2508.09246

68. Clifford Cheung, **Grant N. Remmen** Phys. Rev. D **112** (2025) 016017
*Multipositivity Bounds for Scattering Amplitudes* arXiv:2505.05553

PUBLICATIONS, CONTINUED

67. Ning Bao, **Grant N. Remmen** Int. J. Mod. Phys. D **34** (2025) 2544009
*Black Hole Complementarity and ER/EPR* arXiv:2503.16610
Honorable Mention, 2025 Awards for Essays on Gravitation, Gravity Research Foundation

66. Nima Arkani-Hamed, Carolina Figueiredo, **Grant N. Remmen** JHEP **4** (2025) 39
*Open String Amplitudes:* arXiv:2412.20639
*Singularities, Asymptotics, and New Representations*

65. Avik Banerjee, Achilleas P. Porfyriadis, **Grant N. Remmen** JHEP **4** (2025) 149
*Accidental Symmetry Near Extreme Spinning Black Holes* arXiv:2412.19880

64. **Grant N. Remmen**, Nicholas L. Rodd Phys. Rev. D **113** (2026) 036027
*Positively Identifying Higgs Effective Field Theory or* arXiv:2412.07827
*Standard Model Effective Field Theory*

63. Gauthier Durieux, **Grant N. Remmen**, SciPost Phys. Comm. Rep. 6 (2025)
Nicholas L. Rodd et al. arXiv:2411.02483
*LHC EFT WG Note: Basis for Anomalous Quartic Gauge Couplings*

62. Clifford Cheung, Aaron Hillman, **Grant N. Remmen** Phys. Rev. D **111** (2025) 086034
*Uniqueness Criteria for the Virasoro-Shapiro Amplitude* arXiv:2408.03362

61. Clifford Cheung, Aaron Hillman, **Grant N. Remmen** Phys. Rev. Lett. **133** (2024) 251601
*Bootstrap Principle for the Spectrum and Scattering of Strings* arXiv:2406.02665

60. Gary T. Horowitz, Maciej Kolanowski, JHEP **5** (2024) 122
**Grant N. Remmen**, Jorge E. Santos arXiv:2403.00051
*Sudden Breakdown of Effective Field Theory Near*
*Cool Kerr-Newman Black Holes*

59. Rafael Aoude, Gilly Elor, **Grant N. Remmen**, Fortschr. Phys. **74** (2026) e70113
Olcyr Sumensari arXiv:2402.16956
*Positivity in Amplitudes and Quantum Entanglement*

58. Nima Arkani-Hamed, Clifford Cheung, Phys. Rev. Lett. **132** (2024) 091601
Carolina Figueiredo, **Grant N. Remmen** arXiv:2312.07652
*Multiparticle Factorization and the Rigidity of String Theory*

57. Aidan Chatwin-Davies, Pompey Leung, **Grant N. Remmen** Phys. Rev. D **109** (2024) 046003
*Holographic Screen Sequestration* arXiv:2312.06750

56. Xi Dong, **Grant N. Remmen**, Diandian Wang, JHEP **11** (2023) 207
Wayne W. Weng, Chih-Hung Wu arXiv:2308.07952
*Holographic Entanglement from the UV to the IR*

55. Clifford Cheung, **Grant N. Remmen** Phys. Rev. D **108** (2023) 086009
*Bespoke Dual Resonance* arXiv:2308.03833

54. Gary T. Horowitz, Maciej Kolanowski, Phys. Rev. Lett. **131** (2023) 091402
**Grant N. Remmen**, Jorge E. Santos Editors' Suggestion
*Extremal Kerr Black Holes as Amplifiers of New Physics* arXiv:2303.07358

53. Clifford Cheung, **Grant N. Remmen** Phys. Rev. D **108** (2023) 026011
*Stringy Dynamics from an Amplitudes Bootstrap* arXiv:2302.12263

52. Achilleas P. Porfyriadis, **Grant N. Remmen** JHEP **3** (2023) 125
*Charged Dilatonic Spacetimes in String Theory* arXiv:2301.08256

51. Clifford Cheung, **Grant N. Remmen** JHEP **1** (2023) 122
*Veneziano Variations: How Unique are String Amplitudes?* arXiv:2210.12163

50. Marat Freytsis, Soubhik Kumar, **Grant N. Remmen**, Nicholas L. Rodd JHEP **9** (2023) 41
*Multifield Positivity Bounds for Inflation* arXiv:2210.10791

49. Juan Maldacena, **Grant N. Remmen** JHEP **8** (2022) 152
*Accumulation-Point Amplitudes in String Theory* arXiv:2207.06426

PUBLICATIONS, CONTINUED

48. **Grant N. Remmen**, Nicholas L. Rodd — JHEP **9** (2022) 30
*Spinning Sum Rules for the Dimension-Six SMEFT* — arXiv:2206.13524

47. Yu-tin Huang, **Grant N. Remmen** — Phys. Rev. D **106** (2022) L021902
*UV-Complete Gravity Amplitudes and the Triple Product* — arXiv:2203.00696

46. Achilleas P. Porfyriadis, **Grant N. Remmen** — JHEP **3** (2022) 107
*Large Diffeomorphisms and Accidental Symmetry of the Extremal Horizon* — arXiv:2112.13853

45. **Grant N. Remmen** — Gen. Rel. Grav. **53** (2021) 101
*Exploration of a Singular Fluid Spacetime* — arXiv:2111.08713

44. Nima Arkani-Hamed, Yu-tin Huang, Jin-Yu Liu, **Grant N. Remmen** — JHEP **3** (2022) 83
*Causality, Unitarity, and the Weak Gravity Conjecture* — arXiv:2109.13937

43. **Grant N. Remmen** — Phys. Rev. Lett. **127** (2021) 241602
*Amplitudes and the Riemann Zeta Function* — Editors' Suggestion
arXiv:2108.07820

42. Achilleas P. Porfyriadis, **Grant N. Remmen** — JHEP **10** (2021) 142
*Horizon Acoustics of the GHS Black Hole and the Spectrum of $AdS_2$* — arXiv:2106.10282

41. Ning Bao, Aidan Chatwin-Davies, **Grant N. Remmen** — JHEP **7** (2021) 113
*Entanglement Wedge Cross Section Inequalities from Replicated Geometries* — arXiv:2106.02640

40. Ning Bao, Jonathan Harper, **Grant N. Remmen** — Phys. Rev. D **105** (2022) 026010
*Holevo Information of Black Hole Mesostates* — arXiv:2103.06888

39. **Grant N. Remmen**, Nicholas L. Rodd — Phys. Rev. D **105** (2022) 036006
*Signs, Spin, SMEFT: Sum Rules at Dimension Six* — arXiv:2010.04723

38. Rafael Aoude et al. (including **Grant N. Remmen**) — Snowmass 2021 Letter of Interest
*On-Shell Methods for the SMEFT*

37. Ning Bao, Aidan Chatwin-Davies, **Grant N. Remmen** — JHEP **9** (2020) 102
*Warping Wormholes with Dust:*
*a Metric Construction of the Python's Lunch* — arXiv:2006.10762

36. **Grant N. Remmen**, Nicholas L. Rodd — Phys. Rev. Lett. **125** (2020) 081601
*Flavor Constraints from Unitarity and Analyticity* — arXiv:2004.02885

35. Clifford Cheung, **Grant N. Remmen** — JHEP **5** (2020) 100
*Entanglement and the Double Copy* — arXiv:2002.10470

34. Ning Bao, Aidan Chatwin-Davies, Jason Pollack, **Grant N. Remmen** — JHEP **8** (2020) 65
*Cosmological Decoherence from Thermal Gravitons* — arXiv:1911.10207

33. **Grant N. Remmen**, Nicholas L. Rodd — JHEP **12** (2019) 32
*Consistency of the Standard Model Effective Field Theory* — arXiv:1908.09845

32. Ning Bao, Aidan Chatwin-Davies, Jason Pollack, **Grant N. Remmen** — JHEP **7** (2019) 152
*Towards a Bit Threads Derivation of*
*Holographic Entanglement of Purification* — arXiv:1905.04317

31. Clifford Cheung, Junyu Liu, **Grant N. Remmen** — Phys. Rev. D **100** (2019) 046003
*Entropy Bounds on Effective Field Theory from*
*Rotating Dyonic Black Holes* — arXiv:1903.09156

30. Raphael Bousso, Yasunori Nomura, **Grant N. Remmen** — Phys. Rev. D **99** (2019) 046002
*Outer Entropy and Quasilocal Energy* — arXiv:1812.06987

29. Ning Bao, Aidan Chatwin-Davies, **Grant N. Remmen** — JHEP **2** (2019) 110
*Entanglement of Purification and Multiboundary Wormhole Geometries* — arXiv:1811.01983

PUBLICATIONS, CONTINUED

28. **Grant N. Remmen** Phys. Rev. D **98** (2018) 124008
*New Spacetimes for Rotating Dust in* arXiv:1810.12305
*$(2+1)$-Dimensional General Relativity*

27. Ning Bao, Aidan Chatwin-Davies, Jason Pollack, **Grant N. Remmen** JHEP **11** (2018) 71
*Traversable Wormholes as Quantum Channels:* arXiv:1808.05963
*Exploring CFT Entanglement Structure and Channel Capacity in Holography*

26. Yasunori Nomura, **Grant N. Remmen** JHEP **8** (2018) 63
*Area Law Unification and the Holographic Event Horizon* arXiv:1805.09339

25. Venkatesa Chandrasekaran, **Grant N. Remmen**, JHEP **11** (2018) 15
Arvin Shahbazi-Moghaddam arXiv:1804.03153
*Higher-Point Positivity*

24. Clifford Cheung, Junyu Liu, **Grant N. Remmen** JHEP **10** (2018) 4
*Proof of the Weak Gravity Conjecture from Black Hole Entropy* arXiv:1801.08546

23. Ning Bao, Sean M. Carroll, Aidan Chatwin-Davies, Phys. Rev. D **97** (2018) 126014
Jason Pollack, **Grant N. Remmen** arXiv:1712.04955
*Branches of the Black Hole Wave Function Need Not Contain Firewalls*

22. Chris Akers, Raphael Bousso, Illan F. Halpern, Phys. Rev. D **97** (2018) 024018
**Grant N. Remmen** arXiv:1711.06689
*Boundary of the Future of a Surface*

21. Clifford Cheung, **Grant N. Remmen**, Chia-Hsien Shen, Congkao Wen JHEP **4** (2018) 129
*Pions as Gluons in Higher Dimensions* arXiv:1709.04932

20. Clifford Cheung, **Grant N. Remmen** JHEP **9** (2017) 2
*Hidden Simplicity of the Gravity Action* arXiv:1705.00626

19. Sean M. Carroll, **Grant N. Remmen** Phys. Rev. D **95** (2017) 123504
*A Nonlocal Approach to the Cosmological Constant Problem* arXiv:1703.09715

18. Ning Bao, **Grant N. Remmen** EPL **121** (2018) 60007, Editor's Choice
*Bulk Connectedness and Boundary Entanglement* arXiv:1703.00018

17. Clifford Cheung, **Grant N. Remmen** JHEP **1** (2017) 104
*Twofold Symmetries of the Pure Gravity Action* arXiv:1612.03927

16. Clifford Cheung, **Grant N. Remmen** Phys. Rev. Lett. **118** (2017) 051601
*Positivity of Curvature-Squared Corrections in Gravity* arXiv:1608.02942

15. **Grant N. Remmen**, Ning Bao, Jason Pollack JHEP **7** (2016) 48
*Entanglement Conservation, ER = EPR,* arXiv:1604.08217
*and a New Classical Area Theorem for Wormholes*

14. Sean M. Carroll, **Grant N. Remmen** Phys. Rev. D **93** (2016) 124052
*What is the Entropy in Entropic Gravity?* arXiv:1601.07558

13. Clifford Cheung, **Grant N. Remmen** JHEP **4** (2016) 2
*Positive Signs in Massive Gravity* arXiv:1601.04068

12. Ning Bao, Jason Pollack, **Grant N. Remmen** JHEP **11** (2015) 126
*Wormhole and Entanglement (Non-)Detection* arXiv:1509.05426
*in the ER = EPR Correspondence*

11. Brando Bellazzini, Clifford Cheung, **Grant N. Remmen** Phys. Rev. D **93** (2016) 064076
*Quantum Gravity Constraints from Unitarity and Analyticity* arXiv:1509.00851

10. Ning Bao, Jason Pollack, **Grant N. Remmen** Fortschr. Phys. **63** (2015) 705
*Splitting Spacetime and Cloning Qubits:* arXiv:1506.08203
*Linking No-Go Theorems across the ER = EPR Duality*

PUBLICATIONS, CONTINUED

9. Ning Bao, ChunJun Cao, Sean M. Carroll, Aidan Chatwin-Davies, Nicholas Hunter-Jones, Jason Pollack, **Grant N. Remmen** Phys. Rev. D **91** (2015) 125036 arXiv:1504.06632
*Consistency Conditions for an AdS Multiscale Entanglement Renormalization Ansatz Correspondence*

8. Clifford Cheung, **Grant N. Remmen** JHEP **12** (2014) 87 arXiv:1407.7865
*Infrared Consistency and the Weak Gravity Conjecture*

7. **Grant N. Remmen**, Sean M. Carroll Phys. Rev. D **90** (2014) 063517 arXiv:1405.5538
*How Many e-Folds Should We Expect from High-Scale Inflation?*

6. Clifford Cheung, **Grant N. Remmen** Phys. Rev. Lett. **113** (2014) 051601 arXiv:1402.2287
*Naturalness and the Weak Gravity Conjecture*

5. **Grant N. Remmen**, Sean M. Carroll Phys. Rev. D **88** (2013) 083518 arXiv:1309.2611
*Attractor Solutions in Scalar-Field Cosmology*

4. **Grant N. Remmen**, Kris Davidson, Andrea Mehner Astrophys. J. **773** (2013) 27 arXiv:1302.2659
*Unexpected Ionization Structure in Eta Carinae's "Weigelt Knots"*

3. **Grant N. Remmen**, Kinwah Wu Mon. Not. R. Astron. Soc. **430** (2013) 1940 arXiv:1301.2836
*Complex Orbital Dynamics of a Double Neutron Star System Revolving around a Massive Black Hole*

2. **Grant Remmen**, Elwood McCreary JURP **25** (2012)
*Measurement of the Speed and Energy Distribution of Cosmic Ray Muons*

1. **Grant Remmen** JURP **23** (2010)
*A New Assessment of Dark Matter in the Milky Way Galaxy*

TALKS

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| University of Illinois, Urbana-Champaign \| High Energy Physics Seminar | November 2026 |
| UCLA, Bhaumik Institute \| Informal Theory Seminar | October 2026 |
| Northeastern University \| IMPACT Seminar | October 2026 |
| Harvard University \| Swampland Group Seminar | September 2026 |
| Pro(v/b)ing the Swampland Workshop \| Instituto de Física Teórica, UAM-CSIC, Madrid, Spain | September 2026 |
| Harvard University \| Quantum Gravity Seminar | August 2026 |
| Amplitudes 2026 \| Queen Mary University of London | July 2026 |
| Stony Brook University, Simons Center for Geometry and Physics \| Physics Seminar | May 2026 |
| Tufts University \| Joint Tufts/MIT Cosmology Seminar | March 2026 |
| Online Swampland Seminar Series (IFT Madrid, CERN, Hamburg, Harvard) \| Swampland Seminar (virtual) | March 2026 |
| Scuola Normale Superiore, Pisa, Italy \| Theory Seminar (virtual) | February 2026 |
| UNC Chapel Hill \| High Energy Theory Seminar | February 2026 |
| UNC Chapel Hill \| Physics & Astronomy Department Colloquium | February 2026 |
| Institute for Advanced Study \| Amplitudes Group Informal Talk | January 2026 |
| Niels Bohr Institute, University of Copenhagen \| Quantum Gravity Seminar (virtual) | January 2026 |
| Anhui University of Science & Technology, Center for Fundamental Physics, Huainan, China \| ASU-AUST-USTC Theoretical Physics Colloquium (virtual) | January 2026 |
| Ludwig-Maximilians-Universität, Munich \| Fields and Strings Seminar (virtual) | December 2025 |
| Carnegie Mellon University \| High Energy Physics Theory Seminar | November 2025 |

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| TALKS, CONTINUED | Southeastern Regional Mathematical String Theory Meeting \| Virginia Tech | November 2025 |
| | City College, CUNY \| High Energy Seminar | October 2025 |
| | Stanford University \| LITP Colloquium | October 2025 |
| | New York University, CCPP \| Brown Bag Seminar | September 2025 |
| | University of Rhode Island \| Physics Colloquium | September 2025 |
| | Lawrence Berkeley National Laboratory \| Particle Seminar | September 2025 |
| | New York University, CCPP \| High Energy Physics Seminar | September 2025 |
| | CERN TH Institute on Positivity, Amplitudes, and Phenomenology \| CERN | April 2025 |
| | Yale University \| High Energy Particle Theory Seminar | April 2025 |
| | Institute for Advanced Study \| Amplitudes Group Meeting | March 2025 |
| | Ohio State University \| Physics Department Colloquium | February 2025 |
| | What is Particle Theory? Program \| Kavli Institute for Theoretical Physics | February 2025 |
| | UC Davis, QMAP \| Fields, Strings, Gravity Seminar (virtual) | February 2025 |
| | Texas A&M University \| Physics Department Colloquium | January 2025 |
| | Texas A&M University \| High Energy Physics Seminar | January 2025 |
| | Durham University, UK \| Amplitudes and Correlators Seminar (virtual) | December 2024 |
| | Northeastern University \| High Energy Theory Seminar (virtual) | November 2024 |
| | CERN \| ATLAS Electroweak Working Group Meeting (virtual) | September 2024 |
| | Solvay Workshop on Near-Extremal Black Holes \| International Solvay Institutes and ULB, Brussels, Belgium | September 2024 |
| | Modern Trends in Gravity and Black Holes Workshop \| University of Crete, Greece | June 2024 |
| | Harvard University \| Swampland Seminar | May 2024 |
| | Surveying the Landscape Workshop \| University of Massachusetts Amherst, ACFI | April 2024 |
| | Johns Hopkins University \| High Energy Physics Theory Seminar | April 2024 |
| | Particle Theory Initiative, What is String Theory? Program \| Kavli Institute for Theoretical Physics | March 2024 |
| | California Institute of Technology \| High Energy Theory Seminar | March 2024 |
| | University of Wisconsin–Madison \| Theory Seminar | February 2024 |
| | University of Pennsylvania \| High Energy Theory Seminar | January 2024 |
| | Columbia University \| Theory Seminar | January 2024 |
| | University of Washington \| Particle Theory Seminar | November 2023 |
| | Crete Center for Theoretical Physics \| High Energy Seminar (virtual) | November 2023 |
| | New York University, CCPP \| Brown Bag Seminar | October 2023 |
| | Boston University \| High Energy Theory Seminar | September 2023 |
| | Swamplandia Workshop \| Instituto de Física Teórica, UAM-CSIC, and Harvard University, Madrid, Spain | September 2023 |
| | Amplitudes 2023 \| CERN | August 2023 |
| | Strings 2023 \| Perimeter Institute for Theoretical Physics | July 2023 |
| | Kavli Institute for Theoretical Physics \| Generalized Symmetries Reading Group | June 2023 |

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| TALKS, CONTINUED | Quark Confinement 2023 \| University of Minnesota<br>Simons Collaboration on Confinement and QCD Strings | May 2023 |
| | Kavli Institute for Theoretical Physics \| Locals' Lunch Talk | April 2023 |
| | CERN \| Standard Model Electroweak Group Meeting, ATLAS Collaboration (virtual) | April 2023 |
| | McGill University \| High Energy Theory Group Meeting (virtual) | April 2023 |
| | University of Chicago, Kadanoff Center for Theoretical Physics \|<br>Particle Theory Seminar | April 2023 |
| | Princeton University \| High Energy Theory Seminar | March 2023 |
| | California Amplitudes Meeting \| UC San Diego | March 2023 |
| | University of Michigan, LCTP \| High Energy Theory Seminar (two parts) | March 2023 |
| | Indiana University \| High-Energy Physics/Astrophysics Seminar | March 2023 |
| | California Institute of Technology \| Amplitudes Group Meeting | February 2023 |
| | Bootstrapping Quantum Gravity Program \| Kavli Institute for Theoretical Physics | February 2023 |
| | Stony Brook University, Simons Center for Geometry and Physics \|<br>Special Physics Seminar | February 2023 |
| | UC Davis, QMAP \| Particles/Cosmology Seminar | January 2023 |
| | Brown University \| High Energy Theory Seminar (virtual) | November 2022 |
| | Number Theory and Physics Workshop \|<br>Simons Center for Geometry and Physics, Stony Brook University (virtual) | October 2022 |
| | Institute for Advanced Study \| Amplitudes Group Meeting | October 2022 |
| | Simons Symposium on Amplitudes Meet Cosmology \| Scotland | May 2022 |
| | UC Santa Barbara \| High Energy and Gravity Seminar | May 2022 |
| | Possible and Impossible in Effective Field Theory:<br>From the S-Matrix to the Swampland Workshop \| Institute for Advanced Study | May 2022 |
| | Argonne National Laboratory \| High Energy Physics Theory Seminar (virtual) | April 2022 |
| | Kavli IPMU, University of Tokyo \| Mathematics - String Theory Seminar (virtual) | April 2022 |
| | California Amplitudes Meeting \| UC Davis | March 2022 |
| | California Institute of Technology \| Amplitudes Group Meeting | February 2022 |
| | UC Irvine \| Particle Physics Seminar | January 2022 |
| | QCD Meets Gravity Workshop \| UCLA (virtual) | December 2021 |
| | Kavli Institute for Theoretical Physics \| Locals' Event | November 2021 |
| | UC Santa Barbara \| High Energy and Gravity Seminar (virtual) | November 2021 |
| | Abdus Salam International Centre for Theoretical Physics, Trieste, Italy \|<br>High Energy, Cosmology, and Astroparticle Physics Seminar (virtual) | November 2021 |
| | Brandeis University \| Quantum/Gravity Seminar (virtual) | November 2021 |
| | ETH Zürich \| QFT, Strings and Beyond Seminar (virtual) | October 2021 |
| | Perimeter Institute \| Quantum Fields and Strings Seminar (virtual) | October 2021 |
| | Hertz Foundation Innovation Hour (virtual) | June 2021 |
| | California Amplitudes Meeting \| UCLA (virtual) | March 2021 |
| | New York University \| Physics Department Colloquium (virtual) | March 2021 |

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| TALKS, CONTINUED | New York University \| Physics Research Seminar (virtual) | February 2021 |
| | University of Florida \| High Energy Physics Seminar (virtual) | January 2021 |
| | University of Chicago \| Particle Theory Seminar (virtual) | January 2021 |
| | Korea Institute for Advanced Study \| High Energy Physics Seminar (virtual)<br>Seoul, South Korea | December 2020 |
| | UC Santa Barbara \| High Energy and Gravity Seminar (virtual) | November 2020 |
| | Yale University \| Particle Theory Seminar (virtual) | October 2020 |
| | Brookhaven National Laboratory \| High Energy Theory Seminar (virtual) | April 2020 |
| | Kavli IPMU, Univ. Tokyo \| Astronomy-Cosmology-Particle Physics Seminar (virtual) | April 2020 |
| | UC Davis, QMAP \| Fields, Strings, Gravity Seminar (virtual) | April 2020 |
| | The String Swampland and Quantum Gravity<br>Constraints on Effective Theories Program \| Kavli Institute for Theoretical Physics | March 2020 |
| | Brandeis University \| High-Energy and Gravitational Theory Chalk Talk | January 2020 |
| | Brandeis University \| Physics Department Colloquium | January 2020 |
| | University of Michigan, LCTP \| High Energy Theory Seminar | November 2019 |
| | From Scattering to Expansion Workshop \| Northwestern University | October 2019 |
| | UC Santa Barbara \| Particle Physics Phenomenology Seminar | October 2019 |
| | UC Santa Barbara \| High Energy and Gravity Seminar | October 2019 |
| | Navigating the Swampland Workshop \|<br>Instituto de Física Teórica, UAM-CSIC, Madrid, Spain | September 2019 |
| | University of Washington \| AdS/CFT Group Meeting | May 2019 |
| | University of Washington \| Particle Theory Seminar | May 2019 |
| | University of Minnesota, FTPI \| High Energy Theory Seminar | April 2019 |
| | Stanford University \| Stanford Institute for Theoretical Physics Colloquium | April 2019 |
| | UC Berkeley \| 4D Seminar | April 2019 |
| | California Institute of Technology \| High Energy Theory Seminar | February 2019 |
| | UC Davis \| Joint Theory Seminar | January 2019 |
| | Harvard University \| Black Hole Initiative Colloquium | November 2018 |
| | Cornell University \| Particle Theory Seminar | October 2018 |
| | Institute for Advanced Study \| High Energy Theory Seminar | October 2018 |
| | Vistas over the Swampland Workshop \|<br>Instituto de Física Teórica, UAM-CSIC, Madrid, Spain | September 2018 |
| | King's College London \|<br>Special Seminar, Theoretical Particle Physics & Cosmology | June 2018 |
| | Gravity, Cosmology & Physics Beyond the Standard Model Conference \|<br>LPNHE, UPMC, Paris, France | June 2018 |
| | Sakurai Thesis Prize Talk \| American Physical Society April Meeting, Columbus, OH<br>*Quantum Gravity Constraints for Effective Field Theories* | April 2018 |
| | University of Illinois, Urbana-Champaign \|<br>Mathematical and Theoretical Physics Seminar | April 2018 |
| | McGill University \| High Energy Theory Group Seminar (virtual) | March 2018 |

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| TALKS, CONTINUED | California Institute of Technology \| High Energy Theory Seminar | February 2018 |
| | California Institute of Technology \| Quantum Spacetime Meeting | February 2018 |
| | UC Berkeley \| String Seminar | February 2018 |
| | Stanford University \| Stanford Institute for Theoretical Physics Seminar | January 2018 |
| | SLAC National Accelerator Laboratory \| Elementary Particle Physics Theory Seminar | October 2017 |
| | Institute for Advanced Study \| High Energy Theory Seminar | October 2017 |
| | Massachusetts Institute of Technology \| String/Gravity Theory Seminar | May 2017 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | April 2017 |
| | California Institute of Technology \| Theoretical Physics Journal Club | April 2017 |
| | UC Berkeley \| String Seminar | February 2017 |
| | QCD Meets Gravity Workshop \| UCLA | December 2016 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | November 2016 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | October 2016 |
| | Johns Hopkins University \| High Energy Theory/Cosmology Seminar | October 2016 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | May 2016 |
| | New York University \| High Energy Seminar | April 2016 |
| | Harvard University \| Particle Theory Seminar | April 2016 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | February 2016 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | November 2015 |
| | California Institute of Technology \| Theoretical Physics Journal Club | October 2015 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | April 2015 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | February 2015 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | October 2014 |
| | California Institute of Technology \| Theoretical Physics Journal Club (two parts) | October 2014 |
| | $20^{\text{th}}$ International Symposium on Particles, Strings and Cosmology (PASCOS 2014) \| Warsaw, Poland | June 2014 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | May 2014 |
| | California Institute of Technology \| Theoretical Physics Journal Club | February 2014 |
| | California Institute of Technology \| Theoretical Physics Research Group Meeting | February 2014 |
| | California Institute of Technology \| Theoretical Physics Journal Club | September 2013 |
| | Hertz Foundation $50^{\text{th}}$ Anniversary Symposium \| Poster Presentation | August 2013 |
| | American Physical Society April Meeting, Denver, CO | April 2013 |
| | Mullard Space Science Laboratory, United Kingdom \| Theory Group Meeting | August 2011 |
| | Dean's Summer International Student Day of Talks \| University College London, United Kingdom | August 2011 |
| | $217^{\text{th}}$ Meeting of the American Astronomical Society, Seattle, WA \| Poster Presentation | January 2011 |

**Conference Organization**

Conference Co-Chair | Kavli Institute for Theoretical Physics (virtual) — October 2020
*UV Meets the IR: Effective Field Theory Bounds from QFT to String Theory*

**Seminar Organization**

Organizer | KITP Locals' Event Series — 2022–2023

Organizer | UC Santa Barbara High Energy and Gravity Seminar Series — 2020–2021

Organizer | UC Berkeley HEP-QIS Seminar Series — 2018–2019

Organizer | UC Berkeley String Seminar Series — 2017–2019

**Teaching Experience**

**Galileo Gailiei Institute**, Florence, Italy — (upcoming) December 2026
Invited instructor and course designer, LACES 2026
*Advanced Lectures on Fields and Strings (Lezioni Avanzate di Campi e Stringhe): Advanced General Relativity*

**UC Santa Barbara, Department of Physics** — Fall 2020
Instructor and organizer of graduate short course
*Impossible Physics: Constraining the Laws of Nature, from Scattering Amplitudes to Black Holes*

**UC Berkeley, Department of Physics** — April 2018
Guest lecturer in Prof. Petr Hořava's Quantum Field Theory course

**University of Minnesota, Institute of Technology, Department of Astronomy** — Fall 2009
Teaching assistant to Prof. Robert Gehrz, Department Chair

**Science Outreach**

Outreach talk, *Quantum Field Theory is the Language of Theoretical Physics* | KITP Teachers' Conference: "This is Particle Theory" — February 2025

Interacted with various major donors at the request of KITP — 2022–2023

Outreach talk for KITP administrative staff — May 2021

Guest lecturer for Caltech's *Storytelling for Scientists* course — April 2021

Presented talks on dark matter to physics classes in rural Minnesota — 2011

**Theses**

**Ph.D., Physics** | California Institute of Technology — Defended May 2017
Grant Newton Remmen
*Defining Gravity: Effective Field Theory, Entanglement, and Cosmology*
Thesis advisors: Clifford Cheung and Sean M. Carroll, California Institute of Technology

**B.S., Mathematics**, *summa cum laude* | University of Minnesota — Defended May 2012
Grant N. Remmen
*Dynamics of a Rigid Spinning Ring in the Schwarzschild Metric: A Solution to a Gravitational Problem in Mathematical Physics*
Thesis advisor: Willard Miller, School of Mathematics, University of Minnesota
Research supervised by Kinwah Wu, Head of Theory, Mullard Space Science Laboratory, University College London.

**B.S., Astrophysics**, *summa cum laude* | University of Minnesota — Defended December 2011
Grant N. Remmen
Hubble Space Telescope *Subpixel Modeling of Anomalous High-Excitation Emission Lines in the Ejecta of Eta Carinae*
Thesis advisor: Kris Davidson, MN Institute for Astrophysics, University of Minnesota

**B.S., Physics**, *summa cum laude* | University of Minnesota — Defended April 2010
Grant Remmen
*Distortion of Black Holes caused by Motion relative to the Cosmic Microwave Background*
Thesis advisor: Robert Gehrz, Director, MN Institute for Astrophysics, University of Minnesota

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| Journal Referee | Physical Review Letters | |
| | Physical Review D | |
| | Journal of High Energy Physics | |
| | Nuclear Physics B | |
| | Scientific Reports - Nature | |
| | Communications in Mathematical Physics | |
| | Annales Henri Poincaré | |
| | European Physical Journal C | |
| Undergrad. Honors & Awards, University of Minnesota | **Hagstrum Award in Physics** | 2012 |
| | **Outstanding Graduate in Mathematics** | 2012 |
| | **Franklin Scholarship in Physics** | 2011–2012 |
| | **Lando Scholarship in Mathematics** | 2011–2012 |
| | **Richards Scholarship in Mathematics** | 2011–2012 |
| | **Nier Scholarship in Physics** | 2010–2011 |
| | **Thorp Scholarship in Mathematics** | 2010–2011 |
| | **Undergraduate Research Scholarship** | 2010 |
| | **Basford Award in Physics** | 2009–2010 |
| | **Institute of Technology Alumni Award** | 2009–2010 |
| | **Institute of Technology Honors Undergraduate Research Scholarship** | 2009 |
| | **Maroon & Gold Leadership Award** | 2008–2012 |
| | **3M/Alumni Award** | 2008–2012 |
| | **Bentson Scholar** | 2008–2012 |
| | **Dean's List**, College of Science & Engineering/Institute of Technology | 2008–2012 |
| | **McGraw Hill Student Achievement Recognition**, Meritorious Work in General Chemistry | 2008 |
| Leadership, Service, & Cultural Activities | Co-author/-composer of a two-act musical, *From the Earth to the Moon*, based on the Verne novel | |
| | Caltech production of *From the Earth to the Moon* \| | |
| | Mainstage production, Assistant to the Director | 2022 |
| | Public reading (virtual), Music Director | 2021 |
| | California Institute of Technology Graduate Student Council Board of Directors | 2013–2017 |
| | Member, Academics Committee and Director at Large | 2016–2017 |
| | Member, Academics Committee and Physics Representative | 2013–2016 |
| | California Institute of Technology Faculty Library Committee, Student Representative | 2013–2017 |
| | Co-author/-composer of a two-act musical, *Boldly Go!*, a musical parody based upon *Star Trek* | |
| | Caltech production of *Boldly Go!* \| | |
| | Mainstage production, Music Director | 2016 |
| | Public reading, Music Director | 2015 |
| | University Study Abroad May Seminar: *Great Minds of the Renaissance*, Italy \| History of Renaissance scientists (Galileo, da Vinci, etc.) and societal context | 2011 |
| | University of Minnesota Gospel Choir | 2008–2010 |
| | Detroit Lakes Community Summer Band Program | 2008–2010 |
| | University of Minnesota Honors Student Association | 2008–2012 |
| | University of Minnesota volunteer caller for Admissions Office | 2008–2009 |
| | U.S. Department of Education volunteer \| Assembled hygiene kits for Washington, D.C. homeless | 2008 |
| Test Scores | GRE Physics—Perfect Score: 990/990 | 2011 |
| | GRE General—Quantitative: 800/800, Verbal: 720/800, Analytical Writing: 5.5/6.0 | 2011 |
| | SAT—Perfect Score: 2400/2400 | 2008 |
| | SAT II—Perfect Scores: Math Level II 800/800 and Biology–Molecular 800/800 | 2008 |