

Junggi Yoon

Curriculum Vitae

Asian Pacific Center for Theoretical Physics (APCTP)
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Education

Ph.D. **Brown University**, Providence, RI, USA, May 2016.
Physics (Advisor : Prof. Antal Jevicki)

B.S. **Seoul National University**, Seoul, S. Korea, 2010, *summa cum laude*.
Physics and Mathematics (double major)

Research Experience

2021–Present **JRG Leader**, ASIA PACIFIC CENTER FOR THEORETICAL PHYSICS (APCTP), Pohang, Korea.

2018–2021 **Postdoctoral Fellow**, KOREA INSTITUTE FOR ADVANCED STUDY (KIAS), Seoul, Korea.

2016–2018 **Postdoctoral Fellow**, INTERNATIONAL CENTRE FOR THEORETICAL SCIENCES (ICTS-TIFR), Bengaluru, Karnataka, India.

2011–2016 **Research Assistant**, BROWN UNIVERSITY, Providence, RI, USA.
• Topic : Doctoral dissertation
• Advisor : Prof. Antal Jevicki

Teaching Experience

Spring 2014 **Teaching Assistantship**, Brown University, Providence, RI, USA.
PHYS 0040 - Basic Physics 2

Academic Awards and Honors

2022 – 2023 Associate Professor, POSTECH

2022 – 2023 Associate Member, KIAS

2022 – 2026 Mid-Career Researcher Program (Consolidator) Grant, National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT)

2019 – 2021 Basic Research Program (Gibon Yeongu) Grant, National Research Foundation of Korea (NRF) grant funded by the Korea government (MSIT)

2020 Academic Research Award, Korea Institute for Advanced Study (KIAS)

2016 Anthony Houghton Award for Excellence in Theoretical Physics, USA

- 2015–2016 Galkin Fellowship, Galkin Foundation, USA
- 2010–2015 Doctoral Study Abroad Program Fellowship, Korea Foundation for Advanced Studies (KFAS)
- 2010–2011 Graduate School First Year Fellowship, Brown University, USA

Research Interests

- Strongly correlated system and AdS/CFT correspondence
- Black hole information loss problem
- Non-Hermitian Hamiltonian and non-unitary system
- Exact results in irrelevant deformations of QFTs
- Quantum gravity and higher spin gravity

Publications

- 2022 S. Ryu and J. Yoon, “Unitarity of Symplectic Fermion in α -vacua with Negative Central Charge,” (2022) [arXiv:2208.12169 \[hep-th\]](#).
- K. Alkalaev, E. Joung and J. Yoon, “Color decorations of Jackiw-Teitelboim gravity,” *JHEP* **2208** (2022) 286 [arXiv:2204.10214 \[hep-th\]](#).
- K. Alkalaev, E. Joung and J. Yoon, “Schwarzian for colored Jackiw-Teitelboim gravity,” *JHEP* **2209** (2022) 160 [arXiv:2204.09010 \[hep-th\]](#).
- B. Kang and J. Yoon, “Sign-Problem-Free Variant of Complex Sachdev-Ye-Kitaev Model,” *Phys. Rev.* **B105** (2022) 045117 [arXiv:2107.13572 \[hep-th\]](#).
- P. Chen, M. Sasaki, D. Yeom and J. Yoon, “Resolving information loss paradox with Euclidean path integral,” (2022) *accepted in Int. J. Mod. Phys. D* [arXiv:2205.08320 \[gr-qc\]](#).
- P. Chen, M. Sasaki, D. Yeom and J. Yoon, “Tunneling between multiple histories as a solution to the information loss paradox,” (2022) [arXiv:2206.10251 \[gr-qc\]](#).
- D. Bak, C. Kim, S. Yi and J. Yoon, “Python’s Lunches in Jackiw-Teitelboim gravity with matter,” *JHEP* **2204** (2022) 175 [arXiv:2112.04224 \[hep-th\]](#).
- A. Jevicki, X. Liu, J. Yoon and J. Zheng, “Dynamical Symmetry and the Thermofield State at Large N ,” *Universe* **2022**, 8(2) (2022) 114 [arXiv:2109.13381 \[hep-th\]](#).
- 2021 J. Yoon, “A Bound on Chaos from Stability,” *JHEP* **2111** (2021) 097 [arXiv:1905.08815 \[hep-th\]](#).
- P. Chen, M. Sasaki, D. Yeom and J. Yoon, “Solving information loss paradox via Euclidean path integral,” (2021) [arXiv:2111.01005 \[hep-th\]](#).
- K. Lee, P. Yi and J. Yoon, “ $T\bar{T}$ -deformed Fermionic Theories Revisited,” *JHEP* **2107** (2021) 217 [arXiv:2104.09529 \[hep-th\]](#).

- D. Bak, C. Kim, S. Yi and J. Yoon, “Unitarity of Entanglement and Islands in Two-Sided Janus Black Holes,” *JHEP* **2101** (2021) 155 arXiv:2006.11717 [hep-th].
- 2019 Y. Qi, S. Sin and J. Yoon, “Quantum Correction to Chaos in Schwarzian Theory,” *JHEP* **1911** (2019) 035 arXiv:1906.00996 [hep-th].
- P. Narayan, and J. Yoon, “Chaos in Three-dimensional Higher Spin Gravity,” *JHEP* **1907** (2019) 046 arXiv:1903.08761 [hep-th].
- V. Jahnke, K. Kim and J. Yoon, “On the Chaos Bound in Rotating Black Holes,” *JHEP* **1905** (2019) 037 arXiv:1903.09086 [hep-th].
- R.d.M Koch, A. Jevicki, K. Suzuki and J. Yoon, “AdS Maps and Diagrams of Bi-local Holography,” *JHEP* **1903** (2019) 133 arXiv:1810.02332 [hep-th].
- 2018 T. Nosaka, D. Rosa and J. Yoon, “The Thouless time for mass-deformed SYK,” *JHEP* **1809** (2018) 041 arXiv:1804.09934 [hep-th].
- 2017 P. Narayan and J. Yoon, “Supersymmetric SYK Model with Global Symmetry,” *JHEP* **1808** (2017) 159 arXiv:1712.02647 [hep-th].
- J. Yoon, “SYK Models and SYK-like Tensor Models with Global Symmetry,” *JHEP* **1710** (2017) 183 arXiv:1707.01740 [hep-th].
- J. Yoon, “Supersymmetric SYK Model: Bi-local Collective Superfield / Supermatrix Formulation,” *JHEP* **1710** (2017)172 arXiv:1706.05914 [hep-th].
- P. Narayan, J. Yoon, “SYK-like Tensor Models on the Lattice,” *JHEP* **1708** (2017) 083 arXiv:1705.01554 [hep-th].
- S. Chaudhuriand, V. Giraldo-Rivera, A. Joseph, Loganayagam, and J. Yoon, “Abelian Tensor Models on the Lattice,” *Phys. Rev.* **D97** (2017) 086007 arXiv:1705.01930 [hep-th].
- 2016 A. Jevicki, K. Suzuki and J. Yoon, “Bi-Local Holography in the SYK Model,” *JHEP* **1607** (2016) 007 arXiv:1603.06246 [hep-th].
- A. Jevicki and J. Yoon, “ S_N Orbifolds and String Interactions,” *J. Phys.* **A49** (2016) 205401 arXiv:1511.07878 [hep-th].
- A. Jevicki and J. Yoon, “Bulk from Bi-locals in Thermo Field CFT,” *JHEP* **1602** (2016) 090 arXiv:1503.08484 [hep-th].
- 2015 R. d. M. Koch, A. Jevicki, J. P. Rodrigues and J. Yoon, “Canonical Formulation of $O(N)$ Vector/Higher Spin Correspondence,” *J. Phys.* **A48** (2015) 105403 arXiv:1408.4800 [hep-th] .
- R. d. M. Koch, A. Jevicki, J. P. Rodrigues and J. Yoon, “Holography as a Gauge Phenomenon in Higher Spin Duality,” *JHEP* **1501** (2015) 055 arXiv:1408.1255 [hep-th].
- 2014 A. Jevicki, K. Jin and J. Yoon, “ $1/N$ and loop corrections in higher spin AdS_4/CFT_3 duality,” *Phys. Rev.* **D89** (2014) 085039 arXiv:1401.3318 [hep-th].

2013 A. Jevicki and J. Yoon, “Field Theory of Primaries in W_N Minimal Models”
JHEP **1311** (2013) 060 arXiv:1302.3851 [hep-th].

School and Workshop Organizer

- Nov 24 – 29, **Organizer, Frontiers in Theoretical Physics 2022**, *APCTP-POSTECH-2022*, KIAS, Jeju, Korea.
- Oct 30 **Organizer, APCTP Focus Program on “Integrability, Duality and related topics”**, *APCTP*, Pohang, Korea.
- Nov 5, 2022
- Oct 11 – 18, **Organizer, Higher Spin Gravity and its Applications**, *APCTP*, Pohang, 2022 Korea.
- Aug 22 – 26, **Organizer, Junior Research Talks**, *APCTP-Kyunghee University*, Yeosu, 2022 Korea.
- Aug 11 – 19, **Organizer, APCTP Focus Program on “Holography 2022: quantum matter and spacetime”**, *APCTP*, Pohang, Korea.
- 2022
- May 15 – 21, **Organizer, APCTP Focus Program on “Numerical Methods in Theoretical Physics”**, *APCTP*, Pohang, Korea.
- 2022
- April 20 – 22, **Organizer, Pioneer symposium "Novel Perspectives in Black Hole Information Paradox" in 2022 KPS Spring Meeting**, *Online*, Korea.
- 2022
- Jan 23 – 29, **Organizer, Advances in Theoretical Physics 2022**, *APCTP-Kyunghee University*, Jeju, Korea.
- 2022
- Nov 7 – 13, **Organizer, Frontiers in Theoretical Physics 2021**, *APCTP-POSTECH-2021*, KIAS, Jeju, Korea.
- 2021
- Sep 26 **Organizer, APCTP Focus Program on Exact Results on Irrelevant Deformations of QFTs**, *APCTP*, Jeju, Korea.
- Oct 2, 2021
- Jan 7 – 16, **Organizer, 25th APCTP Winter School**, *APCTP*, Pohang, Korea.
- 2021
- Nov 8 – 13, **Organizer, TTbar deformation and Integrability**, *APCTP*, Pohang, Korea.
- 2020
- Sep 21 – 25, **Local Organizer, KIAS Autumn Symposium on String Theory**, *KIAS*, Seoul, Korea.
- 2020
- Jan 30 **Organizer, 24th APCTP Winter School**, *APCTP*, Pohang, Korea.
- Feb 5, 2020
- Sep 23 **Organizer, Higher Spin Gravity: Chaotic, Conformal and Algebraic Aspects**, *APCTP*, Pohang, Korea.
- Oct 2, 2019
- Oct 23 2019 **Organizer, Pioneer symposium "Quantum Chaos: common ground for black holes, quantum many body systems and quantum information" in 2019 KPS Meeting**, *KDJ Center*, Gwangju, Korea.
- 2019
- Oct 7 – 12, **Organizer, K-HEP Workshop (Korean High Energy Physics Workshop)**, *APCTP*, Pohang, Korea.
- 2018

Presentations

- Sep 2, 2022 **CQUEST online Seminar**, *online*, CQUEST, Korea.
“Does Negative central charge always imply non-unitarity?”
- Aug 30, 2022 **Nonperturbative and Numerical Approaches to Quantum Gravity, String Theory and Holography**, *ICTS*, Bangalore, India.
“Does Negative central charge always imply non-unitarity?”
- Aug 24, 2022 **The 15th Asia Pacific Physics Conference**, *online*, Korea.
“Colored Jackiw-Teitelboim Gravity”
- Aug 19, 2022 **APCTP Focus Program “Holography 2022: quantum matter and spacetime”**, *online*, APCTP, Korea.
“Does Negative central charge always imply non-unitarity?”
- Jul 29, 2022 **APCTP Focus Program “Strings, Branes and Gauge Theories”**, *online*, APCTP, Korea.
“ $T\bar{T}$ Deformation of SUSY Model”
- Jun 29, 2022 **KIAS Seminar**, *online*, KIAS, Korea.
“ $T\bar{T}$ Deformation and Negative Norm State”
- Jun 26, 2022 **Fields, Strings and Gravity**, *Hongdae*, KIAS, Korea.
“ $T\bar{T}$ Deformation and SUSY”
- Jun 7, 2022 **Higher Spin Gravity online-club**, *online*, Mons University, Belgium.
“Colored JT Gravity”
- May 26, 2022 **SAG/JRG Workshop – Recent Topics in String Theory**, *APCTP*, Korea.
“ $T\bar{T}$ Deformation of SUSY”
- Apr 20, 2022 **2022 Korean Physical Society Spring Meeting**, *online*, Korea.
“Dynamical Symmetry and Thermofield State at Large N ”
- Dec 14, 2021 **KIAS-YITP 2021 Workshop**, *YITP*, Kyoto, Japan.
“Colored JT Gravity”
- Dec 2, 2021 **New Frontiers in Quantum Field Theory and String Theory**, *KIAS*, Song-do, Korea.
“Colored JT Gravity”
- Nov 30, 2021 **Research Summary 2021: Fields and Gravity**, *IBS*, Daejeon, Korea.
“BF Gravity and its generalizations”
- Nov 8, 2021 **Frontiers in Theoretical Physics 2021**, *Jeju*, Korea.
“Collective Field Theory and SYK Model”
- Oct 21, 2021 **2021 Korean Physical Society Fall Meeting**, *online*, Korea.
“Color Decorations of Jackiw-Teitelboim Gravity”
- Oct 6, 2021 **5th APCTP Alumni Scientific Symposium**, *Jeju*, Korea.
“QFT at Finite Temperature”
- Sep 30, 2021 **APCTP Focus Program: Exact results on irrelevant deformations of QFTs**, *Jeju*, Korea.
“ $T\bar{T}$ Deformed Fermionic Theories Revisited”

- Aug 26, 2021 **Strings and Fields 2021**, *Online*, Korea.
 “ $T\bar{T}$ Deformed Fermionic Theories Revisited”
- Aug 24, 2021 **Holography 2021: Quantum Matter, Information and Spacetime**, *Online*, Korea.
 “Quantum Monte Carlo Simulation of Sachdev-Ye-Kitaev Model”
- Aug 6, 2021 **Seminar in Ewha Womans University**, *Online*, Korea.
 “Quantum Extremal Surface, Island Conjecture and Replica wormhole”
- Aug 5, 2021 **2021 BK Seminar Series, Hanyang University**, *Online*, Korea.
 “Quantum Monte Carlo Simulation of Sachdev-Ye-Kitaev Model”
- Jul 27, 2021 **Gauge/Gravity Duality 2021, CERN**, *Online*, Switzerland.
 “SUSY $T\bar{T}$ Deformation and Negative Norm States”
- Jul 15, 2021 **Higher Structures in QFT and String Theory**, *Online*, Germany-Switzerland-UK.
 “ $T\bar{T}$ Deformed Fermionic Theories Revisited”
- June 16, 2021 **PASCOS 2021**, *online*, Korea.
 “ $T\bar{T}$ Deformed Fermionic Theories Revisited”
- May 4, 2021 **Seminar in Sejong University**, *online*, Korea.
 “ $T\bar{T}$ Deformed Fermionic Theories Revisited”
- Apr 23, 2021 **2021 Korean Physical Society Spring Meeting**, *online*, Korea.
 “SUSY $T\bar{T}$ Deformation and Negative Norm States”
- Feb 24, 2021 **CTPU seminar**, *online*, IBS, Korea.
 “Unitarity of Entanglement and Islands in Two-sided Janus Black Holes”
- Dec 22, 2020 **APCTP Workshop on Theoretical Physics 2020**, *online*, APCTP, Korea.
 “Unitarity of Entanglement and Islands in Two-sided Janus Black Holes”
- Dec 7, 2020 **Seminar**, *online*, Ewha Womans University, Korea.
 “Island Conjecture, Quantum Extremal Surface and Replica Wormhole”
- Nov 28, 2020 **The 61st Workshop on Gravity and Cosmology**, *online*, APCTP, Korea.
 “Unitarity of Entanglement and Islands in Two-sided Janus Black Holes”
- Nov 19, 2020 **String theory, gravity and cosmology (SGC2020)**, *online*, SKKU, APCTP, Korea.
 “Unitarity of Entanglement and Islands in Two-sided Janus Black Holes”
- Nov 5, 2020 **2020 Korean Physical Society Fall Meeting**, *online*, Korea.
 “Quantum Simulation of SYK Models”
- Aug 27, 2020 **Quantum Matter and Quantum Information with Holography**, *online*, APCTP, Korea.
 “Entanglement Islands and Janus Black Holes”
- Aug 27, 2020 **2020 apres-LHC Physics Workshop**, *online*, APCTP, Korea.
 “Recent progress on black hole information loss problem II: Entanglement Island”
- Jul 13, 2020 **2020 Korean Physical Society Spring Meeting**, *online*, Korea.
 “Dynamics of the SYK Model coupled to External D.o.F”
- Jul 7 – 8, 2020 **Updates on Methods of Theoretical Physics**, *online*, APCTP, Korea.
 Three Lectures on “Black hole Information Paradox and Recent Progress”

- Jan 16, 2020 **Mandelstam Theoretical Physics School and Workshop**, Durban, South Africa.
"Higher Spin Black Hole and Chaos"
- Oct 24, 2019 **2019 Korean Physical Society Fall Meeting**, Gwangju, Korea.
"Schwarzian Theory and Chaos"
- Oct 28, 2019 **East Asia Joint Workshop on Fields and Strings 2019**, *NCTS*, Hsinchu, Taiwan.
"Schwarzian Theory and Chaos"
- Sep 23, 2019 **Schwarzian Theory, Chaos and Higher Spin**, *APCTP*, Pohang, Korea.
"Schwarzian Theory, Chaos and Higher Spin"
- Aug 23, 2019 **Quantum Matter from the Entanglement and Holography**, *APCTP*, Pohang, Korea.
"Schwarzian Theory and Chaos"
- Jul 23, 2019 **Strings, Branes and Gauge Theories 2019**, *APCTP*, Pohang, Korea.
"Schwarzian Theory and Chaos"
- Jul 9, 2019 **String 2019**, Brussels, Belgium.
"Chaos in Higher Spin Gravity"
- Jun 19, 2019 **Quantum Information and String Theory 2019**, *YITP*, Kyoto, Japan.
"Chaos in 3D Higher Spin Gravity"
- Mar 22, 2019 **Higher spins and holography**, *ESI*, Vienna, Austria.
"Chaos in 3D Higher Spin Gravity"
- Oct 25, 2018 **3 Lectures**, *Seoul National University*, Seoul, Korea.
"Chaos in black hole and holography"
- Oct 25, 2018 **Research Summary 2019: Fields, Gravity and String Theory**, *APCTP*, Pohang, Japan.
"Various Aspects of SYK-like Models"
- Oct 31, 2018 **Holographic Tensors**, *OISK*, Okinawa, Japan.
"Thermofield Dynamics of SYK model"
- Oct 6, 2018 **High Energy Physics 103**, *Yonsei University*, Seoul, Korea.
"AdS Maps and Diagrams of Bi-local Holography"
- Aug 8 – 16, 2018 **Holography and Geometry of Quantum Entanglement**, *Hanyang University*, Seoul, Korea.
"SYK model and Tensor model"
- Jan 17–23, 2018 **The Second Mandelstam Theoretical Physics School and Workshop**, Durban, South Africa.
"Supersymmetric Sachdev-Ye-Kitaev model with global symmetry"
- Oct 16, 2017 **Quantum Spacetime Seminar**, *TIFR*, Mumbai, India.
"Sachdev-Ye-Kitaev model with global symmetry"
- Jul 31–
Aug 2, 2017 **Bangalore Area Strings Meeting 2017**, *ICTS*, Bangalore, India.
"SYK model with global and super symmetry"

- Jul 9–16, **New ideas on higher spin gravity and holography**, *Kyung Hee University*,
2017 Seoul, Korea.
“Sachdev-Ye-Kitaev Model: Global and Super Symmetry”
- May 8–19, **Student Talks on Trending Topics in Theory 2017**, *CMI*, Chennai, India.
2017 “Fun with Drawing Melons: SYK-Like Tensor Models”
- Dec 15–21, **Indian Strings Meetings 2016**, *IISER*, Pune, India.
2016 “Sachdev-Ye-Kitaev Model as a Matrix-vector Model”
- Dec 15–19, **Joburg Workshop on Matrices, Holography and QCD**, *University of the
2014 Witwatersrand*, Johannesburg, S. Africa.
“Canonical Mapping of O(N) Vector/Higher Spin Correspondence”
- Oct 3, 2014 **Humboldt/Brown Mini-Conference**, *Brown University*, RI, USA.
“Reconstructing Higher Spin Duality”

Outreach Activity

- 2022 **Compère, APCTP Outreach Program “APCTP 2022 Science Book
Lecture Series”**, *Po Eun Library*, Pohang, Korea.