

JI-HOON KIM

Center for Theoretical Physics, Department of Physics and Astronomy,
Seoul National University, Seoul 08826, Republic of Korea

www.jihoonkim.org
me@jihoonkim.org

EDUCATION:

09/2005 - 06/2011 Ph. D., Department of Physics, Stanford University
03/1998 - 02/2002 B. Sc., School of Physics, *summa cum laude*, Seoul National University

PROFESSIONAL APPOINTMENTS:

03/2018 - **Assistant Professor**, Seoul National University, Republic of Korea
07/2016 - 11/2017 **Research Associate**, Stanford University / KIPAC
07/2015 - 06/2017 **Einstein Fellow**, Stanford University / SLAC National Accelerator Laboratory
07/2014 - 06/2015 Einstein Fellow, California Institute of Technology
01/2014 - 06/2014 **Moore Fellow**, California Institute of Technology
11/2013 - 12/2013 Visiting Scholar, Stanford University / KIPAC
09/2011 - 10/2013 **IMPS Postdoctoral Fellow**, University of California at Santa Cruz
09/2005 - 08/2011 Research Assistant, Stanford University

AWARDS AND FELLOWSHIPS (SELECTED):

12/2018 - 11/2023 Samsung Science & Technology Foundation Investigator
09/2018 - 08/2019 Creative-Pioneering Researchers Program Award, Seoul National University (SNU)
07/2014 - 06/2017 Einstein Postdoctoral Fellowship, NASA
01/2014 - 06/2014 Moore Postdoctoral Fellowship, California Institute of Technology
09/2005 - 03/2009 William R. and Sara Hart Kimball Graduate Fellowship, Stanford University
02/2002 Honor at Graduation by the SNU Alumni Association
03/2000 - 02/2002 Korea Foundation for Advanced Studies Fellowship
03/1998 - 02/2002 Merit-based Undergraduate Scholarships, SNU, 7 semesters
03/1998 Honor for Excellence among students entering College of Natural Science, SNU

RESEARCH EXPERIENCES:

2018 - **Assistant Professor**, Dept. of Physics and Astronomy, Seoul National University

- **AGORA Project Coordinator**, *Leading an inter-institutional collaboration for high-resolution simulations comparison since 2012 (160+ participants from 60+ institutions), having led or co-led 3+ papers, organized 7 workshops with 30+ attendees each and 15+ web conferences (as of 2018)*
- **PI, Samsung Science & Technology Foundation** "Towards the Multi-scale Understanding of the Growth of Supermassive Black Holes" (12/2018-11/2023)
- **PI, Creative-Pioneering Researchers Program at SNU** "Towards the Multi-scale Understanding of the Growth of Supermassive Black Holes" (09/2018-08/2019)
- **PI, KISTI KSC** "Towards the Multi-scale Numerical Understanding of SMBHs at Galaxy Centers" (4,600,000.0 SUs on Nurion@KSC, 15,000.0 GB on Nurion@KSC, 12/2018-11/2019)

- **PI, KISTI KSC** “Towards the Understanding of Growth & Evolution of SMBHs at Galaxy Centers” (400,000.0 SUs on Tachyon-II@KSC, 2,000.0 GB on Tachyon-II@KSC, 07/2018-10/2018)
- **Co-I, NASA HEC** “FIRE: DM and Galaxy Formation with Unprecedented Physics and Resolution” (3,166,000.0 SUs on Pleiades@NAS, 100,000.0 GB on Pleiades@NAS, 11/2016-09/2019)
- *Simulating high-redshift quasar hosts with massive black holes and star-forming molecular clouds*
- 2015 - 2017 **Research Associate / Postdoctoral Researcher**, Stanford University / SLAC (Mentor: T. Abel)
 - **PI, NSF XSEDE** “Resolving the Impact of Supermassive Black Hole & Stellar Physics on Galaxies” (3,233,887.0 SUs on Stampede@TACC, 50,000.0 GB on Ranch@TACC, 10/2015-09/2016)
 - **Co-I, NSF XSEDE** “Simulating the Local Group” (3,649,350.9 SUs on Stampede@TACC, 50,000.0 GB on Ranch@TACC, 10/2016-09/2017)
 - *Modeling the accretion and feedback of massive black hole seeds in the high-redshift universe*
- 2014 - 2015 **Postdoctoral Researcher**, California Institute of Technology (Mentor: P. Hopkins)
 - **PI, NSF XSEDE** “Resolving the Impact of Supermassive Black Holes on Galaxies” (1,200,000.0 SUs on Stampede@TACC, 20,000.0 GB on Ranch@TACC, 10/2014-09/2015)
 - *Simulating and analyzing the formation of star clusters in high-redshift proto-galaxies*
- 2013 Visiting Scholar, KIPAC / Stanford University
- 2011 - 2013 **Postdoctoral Researcher**, UC Santa Cruz (Mentors: M. Krumholz & J. Primack)
 - **Co-I, NSF XSEDE** “Star Formation in Galaxies: From Recipes to Real Physics” (on Stampede/Ranger@TACC, Pleiades@NASA, Kraken@NICS)
 - *Modeling radiative feedback of star-forming molecular clouds in galaxy formation*
- 2006 - 2011 **Research Assistant**, KIPAC / SLAC / Stanford University (Advisor: T. Abel)
 - *Simulating galaxy formation and mergers with Adaptive Mesh Refinement*
 - *Modeling the accretion and feedback of massive black holes, formation and feedback of stars*
- 2006 **Research Assistant**, KIPAC / Stanford University (Advisor: S. Church)
 - *Building data pipelines for the QUAD Collaboration*
- 2005 **Research Assistant**, KIPAC / Stanford University (Advisor: E. Bloom)
 - *Studying the cross-correlation between GRBs and SNe Ic events for the Fermi/GLAST Collaboration*
- 2001 Experiment Assistant, Nano-Opto-Electronics Laboratory, SNU (Advisor: H. -S. Jeon)

PEER-REVIEWED PUBLICATIONS:

- **13) Kim, J. -H.**, Wise, J. H., Abel, T., Hopkins, P. F., & Primack, J. R., “Galaxy Formation with Self-consistently Modeled Stars and Massive Black Holes. II: High-redshift Quasar Growth and Feedback”, *ApJ* to be submitted (2018)
- **12) Kim, J. -H.**, Ma, X., Grudic, M. Y., Hopkins, P. F., Hayward, C. C., & 5 other co-authors for the FIRE Collaboration, “Formation of Globular Cluster Candidates in Merging Proto-galaxies at High Redshift: A View from the FIRE Cosmological Simulations”, *astro-ph:1704.02988*, *MNRAS* 474 (2018) 4232
- **11) Hopkins, P. F. et al.** including **Kim, J. -H.**, “The FIRE-2 Simulations: Physics versus Numerics in Galaxy Formation”, *astro-ph:1702.06148*, *MNRAS* 480 (2018) 800
- **10) Butsky, I., Zrake, J., Kim, J. -H., Yang, H. -I., & Abel, T.**, “Ab Initio Simulations of A Supernova Driven Galactic Dynamo in An Isolated Galaxy”, *astro-ph:1610.08528*, *ApJ* 843 (2017) 113

- **9) Kim, J. -H.**, Agertz, O., Teyssier, R., Butler, M. J., Ceverino, D., & 38 other co-authors for the AGORA Collaboration, “The AGORA High-resolution Galaxy Simulations Comparison Project. II: Isolated Disk Test”, *astro-ph:1610.03066, ApJ* 833 (2016) 202
- **8) Wetzel, A.**, Hopkins, P. F., **Kim, J. -H.**, Faucher-Giguere, C-A., Keres, D., & Quataert, E., “Reconciling Dwarf Galaxies with LCDM Cosmology: Simulating A Realistic Population of Satellites Around A Milky Way-Mass Galaxies”, *astro-ph:1602.05957, ApJ* 827 (2016) L23
- **7) Kim, J. -H.**, Abel, T., Agertz, O., Bryan, G. L., Ceverino, D., & 41 other co-authors for the AGORA Collaboration, “The AGORA High-resolution Galaxy Simulations Comparison Project”, *astro-ph:1308.2669, ApJS* 210 (2014) 14
- **6) The Enzo Collaboration including Kim, J. -H.**, “Enzo: An Adaptive Mesh Refinement Code for Astrophysics”, *astro-ph:1307.2265, ApJS* 211 (2014) 19
- **5) Kim, J. -H.**, Krumholz, M. R., Wise, J. H., Turk, M. J., Goldbaum, N. J., & Abel, T., “Dwarf Galaxies with Ionizing Radiation Feedback. II: Spatially-resolved Star Formation Relation”, *astro-ph:1210.6988, ApJ* 779 (2013) 8
- **4) Kim, J. -H.**, Krumholz, M. R., Wise, J. H., Turk, M. J., Goldbaum, N. J., & Abel, T., “Dwarf Galaxies with Ionizing Radiation Feedback. I: Escape of Ionizing Photons”, *astro-ph:1210.3361, ApJ* 775 (2013) 109
- **3) Kim, J. -H.**, & Lee, J., “How Does the Surface Density and Size of Disk Galaxies Measured in Hydrodynamic Simulations Correlate with the Halo Spin Parameter?”, *astro-ph:1210.8321, MNRAS* 432 (2013) 1701
- **2) Kim, J. -H.**, Wise, J. H., Alvarez, M. A., & Abel, T., “Galaxy Formation with Self-consistently Modeled Stars and Massive Black Holes. I: Feedback-regulated Star Formation and Black Hole Growth”, *astro-ph:1106.4007, ApJ* 738 (2011) 54
- **1) Kim, J. -H.**, Wise, J. H., & Abel, T., “Galaxy Mergers with Adaptive Mesh Refinement: Star Formation and Hot Gas Outflow”, *astro-ph:0902.3001, ApJ* 694 (2009) L123

OTHER CONTRIBUTIONS:

- **5) Pineda, J. L. et al. including Kim, J. -H.**, “Bridging the Gap: Observations and Theory of Star Formation Meet on Large and Small Scales”, *Keck Institute for Space Studies Report, Pasadena, CA, November 2014*
- **4) Kaehler, R.**, Abel, T., & **Kim, J. -H.**, “Visualization of a High-resolution Galaxy Formation Simulation”, *SuperComputing '11 Scientific Visualization Companion Proceedings, pp. 133-134, Seattle, WA, November 2011*
- **3) Kim, J. -H.**, “Galaxy Formation and Mergers with Stars and Massive Black Holes”, *Doctoral Dissertation, Stanford University, Stanford, CA, May 2011*
- **2) Kim, J. -H.**, Wise, J. H., & Abel, T., “Galaxy Mergers with Adaptive Mesh Refinement: Star Formation and Hot Gas Outflow”, *American Physical Society April Meeting, Denver, CO, May 2009*
- **1) Kim, J. -H.**, Wise, J. H., & Abel, T., “Galaxy Evolution on Adaptive Mesh Refinement”, *First Stars III Conference, AIP Conference Proceedings, Vol. 990 (2008) pp. 429-431, Santa Fe, NM, July 2007*

PROFESSIONAL AND OUTREACH SERVICES:

- | | |
|--------|---|
| 2018 | Organizer , 7th Workshop for the AGORA Project at UC Santa Cruz (Aug. 10-11, 2018) |
| 2018 - | Committees Served : Graduate Admissions, Graduate Qualification, Academic Affairs |
| 2017 | Organizer, 6th Workshop for the AGORA Project at UC Santa Cruz (Aug. 11-13, 2017) |
| 2016 | Expert Referee, DiRAC Resource Allocation Committee, the United Kingdom |
| 2016 | External Review Panel, NASA Postdoctoral Program Fellowship |
| 2016 | Organizer, 5th Workshop for the AGORA Project at UC Santa Cruz (Aug. 12-14, 2016) |

- 2015 Organizer, 4th Workshop for the AGORA Project at UC Santa Cruz (Aug. 21-23, 2015)
- 2015 External Review Panel, Department of Energy ASCR Leadership Computing Challenge
- 2015 External Review Panel, NASA Earth and Space Science Fellowship
- 2014 Organizer, 3rd Workshop for the AGORA Project at UC Santa Cruz (Aug. 15-17, 2014)
- 2014 - **Referees Served:** Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Astronomy and Computing
- 2013 Organizer, 2nd Workshop for the AGORA Project at UC Santa Cruz (Aug. 16-18, 2013)
- 2012 External Review Panel, NASA Earth and Space Science Fellowship
- 2012 Organizer, Starting Workshop for the AGORA Project at UC Santa Cruz (Aug. 17-19, 2012)
- 2012 - **Project Coordinator,** AGORA High-resolution Galaxy Simulations Comparison Project
- 2010 Provided a movie data of cosmological galaxy mergers and structure formation for the SLAC booth in the SuperComputing '10 conference (SC2010), New Orleans, LA
- 2010 Provided a movie data of cosmological galaxy mergers for the Hayden Planetarium at the American Museum of Natural History, NY in the program of "The Big Bang"
- 2007 - 2011 KIPAC/SLAC Visualization Laboratory Presenter, Laboratory Tour Guide
- 2007 - 2009 Volunteer, SLAC Kids' Day
- 2002 - 2004 Lieutenant, Company Commander & Battalion Staff Officer, the Republic of Korea Army

TEACHING EXPERIENCES:

- 2018 **Lecturer,** Korea Institute for Advanced Studies - Seoul National University
Physics Winter Camp 2018, *Astrophysical Dark Matter*
- 2018 **Lecturer,** 1 semester, Seoul National University, *Topics in Modern Astrophysics and Cosmology*
- 2018 **Guest Lecturer,** Seoul National University, *Classical Mechanics*
- 2016 **Guest Lecturer,** Stanford University, *Computational Cosmology and Astrophysics*
- 2014 **Guest Lecturer,** California Institute of Technology, *Cosmology and Galaxy Formation*
- 2009 Teaching Assistant, 1 quarter, Stanford University, *Black Holes*
- 2008 Course Grader, 1 quarter, Stanford University, *Introduction to Astrophysics*
- 2007 Teaching Assistant, 1 quarter, Stanford University, *Modern Physics Laboratory*
- 2007 Teaching Assistant, 1 quarter, Stanford University, *Mechanics*

ACADEMIC ADVISING EXPERIENCES:

- 09/2018 - Ki-won Kim (M.S. student in Physics)
- 03/2018 - Yongseok Jo (Ph.D. student in Physics), Eun-jin Shin (M.S. student in Physics)

COMPUTING EXPERIENCES:

- Administrator of a 72-processor (144-thread) Intel Xeon SP Gold cluster with 1 TB shared memory (2018 -)
- Program experience: Enzo, Gadget, GIZMO, yt, MUSIC, VisIt, PartiView, HEALpix, CMBFast, etc.
- Language experience: C, C++, Fortran, IDL, Python, Java Applet, Visual Basic, Pascal, Matlab, HTML, etc.

RESEARCH INTERESTS:

- Coordinator, AGORA High-resolution Galaxy Simulations Comparison Project (AGORAsimulations.org)
- Galaxy Formation and Evolution using High-resolution Adaptive Mesh Refinement Simulations
- Radiative/Mechanical/Thermal Feedback from Massive Black Holes and Star-forming Molecular Clouds
- Growth of Supermassive Black Holes and Triggered Star Formation via Gas Inflow or Mergers

TALKS AND SEMINARS (SELECTED):

- **4th Korean-American Kavli Frontiers of Science Symposium**, sponsored by the U.S. National Academy of Sciences (NAS) and the Korean Academy of Science and Technology (KAST), TBA, 06/2019
- **Extremely Big Eyes on the Early Universe**, Kavli Institute for the Physics and Mathematics of the Universe, University of Tokyo, TBA, 03/2019
- **From Star Clusters to Ultra Low-Luminosity Galaxies: Star Formation in Tiny Systems Reaching Back to First Light**, Lorentz Center, University of Leiden, TBA, 02/2019
- **Physics Colloquium**, Seoul National University, "Towards the Understanding of the Growth and Evolution of Supermassive Black Holes at Galaxy Centers", 12/05/2018
- **Physics and Astronomy Colloquium**, Sejong University, "Towards the Understanding of the Growth and Evolution of Supermassive Black Holes at Galaxy Centers", 11/21/2018
- **8th KIAS Workshop on Cosmology and Structure Formation**, Korea Institute for Advanced Study, "Towards the Understanding of the Growth and Evolution of Supermassive Black Holes at Galaxy Centers", 11/06/2018
- **99th Korean Astronomical Society Meeting**, hosted by KAS, "Towards the Understanding of the Growth and Evolution of Supermassive Black Holes at Galaxy Centers", 10/10/2018
- **Physics Seminar**, Korea Institute for Advanced Study, "Dark Matter: A Computational Astrophysicist's Perspective", 10/08/2018
- **Particle Physics Korea Meeting**, Seoul National University, "Dark Matter: A Computational Astrophysicist's Perspective", 09/28/2018
- **Santa Cruz Galaxy Formation Workshop+7th AGORA Workshop**, UC Santa Cruz, joint with Joel Primack, "Overview of the AGORA High-resolution Cosmological Galaxy Simulations Comparison Project: Six Years After Conception", 08/10/2018
- **KDESci Meeting**, Korea Institute for Advanced Study, "Insights from the AGORA High-resolution Galaxy Simulations Comparison", 07/09/2018
- **Galaxies A to Z Workshop**, hosted by Center for Galaxy Evolution Research at Yonsei University, "Studying the Interaction of Supermassive Black Holes and Their Host Galaxies", 06/26/2018
- **Astronomy Colloquium**, Seoul National University, "Upcoming Era in Numerical Galaxy Formation: New Possibilities and Challenges", 05/24/2018
- **Santa Cruz Galaxy Formation Workshop+6th AGORA Workshop**, UC Santa Cruz, "Reproducibility: An Insight from the AGORA High-resolution Galaxy Simulations Comparison", 08/11/2017
- **Einstein Fellows Symposium 2016**, Harvard-Smithsonian Center for Astrophysics, "Reproducibility: An Insight from the AGORA High-resolution Galaxy Simulations Comparison", 10/18/2016
- **Santa Cruz Galaxy Formation Workshop+5th AGORA Workshop**, UC Santa Cruz, "The AGORA High-resolution Galaxy Simulations Comparison. II: Isolated Disk Test - Kickoff Discussion", 08/12/2016
- **Einstein Fellows Symposium 2015**, Harvard-Smithsonian Center for Astrophysics, "Upcoming New Era in Numerical Galaxy Formation: New Challenges and Possibilities", 10/27/2015

- **Santa Cruz Galaxy Formation Workshop+4th AGORA Workshop**, *UC Santa Cruz*, “AGORA Initiative and Infrastructure: Where We Stand and Why We Are Here”, 08/21/2015
- **KIPAC Tea Talk**, *SLAC National Accelerator Laboratory*, “Challenges in Numerical Galaxy Formation and the AGORA Initiative”, 07/24/2015
- **Pasadena Astronomy Postdoc Symposium 2015**, *UCLA Lake Arrowhead Conference Center*, “Challenges in Numerical Galaxy Formation and the AGORA Initiative”, 04/09/2015
- **Astronomy Theory Postdoc Lunch**, *Caltech*, “AGORA High-resolution Galaxy Simulations Comparison Project”, 01/22/2015
- **Astronomy Colloquium**, *Seoul National University*, “Galaxy Formation Simulations in the High-resolution Era: Success and Challenge”, 12/10/2014
- **Einstein Fellows Symposium 2014**, *Harvard-Smithsonian Center for Astrophysics*, “Challenges in Numerical Galaxy Formation and the AGORA Initiative”, 10/28/2014
- **Santa Cruz Galaxy Formation Workshop+3rd AGORA Workshop**, *UC Santa Cruz*, joint with Joel Primack, “Status of the AGORA High-resolution Cosmological Galaxy Simulations Comparison Project: Two Years After Conception”, 08/15/2014
- **Carnegie Observatories Colloquium Series**, *Carnegie Observatories*, “Rethinking Galaxy Simulations in the High-resolution Era”, 03/18/2014
- **Santa Cruz Galaxy Formation Workshop+2nd AGORA Workshop**, *UC Santa Cruz*, “The AGORA Project: Initial Conditions and the Proof-of-concept Test”, 08/16/2013
- **Cosmology Seminar**, *Stanford University*, “Rethinking Galaxy Simulations in the High-resolution Era”, 05/20/2013
- **Santa Cruz Galaxy Formation Workshop+Starting Workshop for the AGORA High-resolution Galaxy Simulations Comparison Project**, *UC Santa Cruz*, “Galaxy Formation with Radiating Molecular Cloud Particles”, 08/17/2012
- **Workshop for Korean Young Cosmologists**, *Korea Astronomy and Space Science Institute*, “High-resolution Galaxy Formation with Massive BHs and Radiating Star Clusters”, 06/25/2012
- **SLAC Association for Student Seminars**, *SLAC National Accelerator Laboratory*, 05/11/2011
- **KIPAC Tea Talk**, *SLAC National Accelerator Laboratory*, “Galaxy Formation and Mergers with Self-consistently Modeled Stars and Massive BHs”, 04/08/2011
- **Friday Lunchtime Astrophysics Seminar**, *UC Santa Cruz*, “Towards An Unabridged Understanding of The Coevolution of Galaxies and Massive BHs: What Have Simulators Tried? Why So Hard?”, 12/10/2010
- **Computational Astrophysics Group Seminar**, *U. Chicago*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 12/03/2010
- **Computational Cosmology and Galaxy Formation Seminar**, *Princeton University*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 11/15/2010
- **Theoretical Astrophysics Center Seminar**, *UC Berkeley*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/25/2010
- **Cosmoclub Seminar**, *UC Santa Cruz*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/18/2010
- **Friday Astro Lunch**, *UC Santa Barbara*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/15/2010

- **Astronomy Tea Talk**, *Caltech*, "Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution", 10/11/2010
- **LCA Group Seminar**, *UC San Diego*, "Galaxy Formation with Self-consistently Modeled Stars and Massive BHs", 09/30/2010
- **Santa Cruz Galaxy Formation Workshop**, *UC Santa Cruz*, "Galaxy Formation with Self-consistently Modeled Stars and Massive BHs", 08/17/2010
- **HIPACC Summer School on Galaxy Formation**, *UC-HIPACC*, "Galaxy Formation using Enzo with Properly Modeled Stars and Massive BHs", 07/28/2010
- **Santa Cruz Galaxy Formation Workshop**, *UC Santa Cruz*, "Galaxy Mergers and Evolution with Adaptive Mesh Refinement", 08/19/2009
- **Cosmology In Northern California Meeting** (CINC09), *UC Santa Cruz*, "Galaxy Mergers and Evolution with Adaptive Mesh Refinement", 05/15/2009
- **American Physical Society April Meeting**, *Session G8 - Plasma Astrophysics of Clusters of Galaxies, Denver*, "Galaxy Mergers with Adaptive Mesh Refinement: Star Formation and Hot Gas Outflow", 05/03/2009
- **JILA Astrophysics Lunch**, *CU Boulder*, "Galaxy Mergers with Adaptive Mesh Refinement", 05/01/2009
- **Bay Area Star Formation Workshop**, *Stanford University*, "Galaxy Mergers with Adaptive Mesh Refinement", 11/14/2008
- **KIPAC Tea Talk**, *SLAC National Accelerator Laboratory*, "Galaxy Mergers with Adaptive Mesh Refinement", 11/07/2008
- **KIPAC Tea Talk**, *Stanford University*, "Simulating Galaxies on Adaptive Mesh Refinement", 04/24/2007