

# JI-HOON KIM

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## 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

## FELLOWSHIPS AND PRIZES (SELECTED):

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 Seoul National University (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* (150+ participants from 60+ institutions), having led or co-led 3+ papers, organized 6 workshops with 40+ attendees each and 15+ web conferences, as of Sep. 2017
- **Co-I, NASA HEC "FIRE: DM and Galaxy Formation with Unprecedented Physics and Resolution"** (4,666,000.0 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)
  - *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”, *MNRAS 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 submitted* (2017)
- **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 SERVICE:

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|--------|--|
| 2017   | <b>Organizer</b> , 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   | <b>Organizer</b> , 5th Workshop for the AGORA Project at UC Santa Cruz (Aug. 12-14, 2016)  |
| 2015   | <b>Organizer</b> , 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   | <b>Organizer</b> , 3rd Workshop for the AGORA Project at UC Santa Cruz (Aug. 15-17, 2014)  |
| 2014 - | <b>Referee</b> : <i>Astrophysical Journal</i> , <i>Monthly Notices of the Royal Astronomical Society</i> ,<br><i>Astronomy and Computing</i>                   |
| 2013   | <b>Organizer</b> , 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   | <b>Organizer</b> , Starting Workshop for the AGORA Project at UC Santa Cruz (Aug. 17-19, 2012)   |
| 2012 - | <b>Project Coordinator</b> , 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 Visualization Laboratory Presenter / Laboratory Tour Guide
- 2007 - 2009 SLAC Kids' Day, Volunteer
- 2002 - 2004 Lieutenant, Company Commander & Battalion Staff Officer, the Republic of Korea Army

**TEACHING EXPERIENCES:**

- 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 Lab*
- 2007 **Teaching Assistant**, 1 quarter, Stanford University, *Mechanics*
- 1998 - 2005 Private Tutor, paid or volunteer, 15+ students at levels ranging from elementary to high school

**RESEARCH INTERESTS:**

- Coordinator, AGORA High-resolution Galaxy Simulations Comparison Project ([AGORAsimulations.org](http://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

**COMPUTATIONAL SKILLS:**

- 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.

**TALKS AND SEMINARS (SELECTED):**

- **Santa Cruz Galaxy Formation Workshop+6th AGORA Workshop**, UC Santa Cruz, "Reproducibility: An Insight from the AGORA High-resolution Galaxy Simulations Comparison", 08/11/17
- **Einstein Fellows Symposium 2016**, Harvard-Smithsonian Center for Astrophysics, "Reproducibility: An Insight from the AGORA High-resolution Galaxy Simulations Comparison", 10/18/16
- **Santa Cruz Galaxy Formation Workshop+5th AGORA Workshop**, UC Santa Cruz, "The AGORA High-resolution Galaxy Simulations Comparison. II: Isolated Disk Test - Kickoff Discussion", 08/12/16
- **Einstein Fellows Symposium 2015**, Harvard-Smithsonian Center for Astrophysics, "Upcoming New Era in Numerical Galaxy Formation: New Challenges and Possibilities", 10/27/15
- **Santa Cruz Galaxy Formation Workshop+4th AGORA Workshop**, UC Santa Cruz, "AGORA Initiative and Infrastructure: Where We Stand and Why We Are Here", 08/21/15
- **KIPAC Tea Talk**, SLAC National Accelerator Laboratory, "Challenges in Numerical Galaxy Formation and the AGORA Initiative", 07/24/15
- **Pasadena Astronomy Postdoc Symposium 2015**, UCLA Lake Arrowhead Conference Center, "Challenges in Numerical Galaxy Formation and the AGORA Initiative", 04/09/15
- **Astronomy Theory Postdoc Lunch**, Caltech, "AGORA High-resolution Galaxy Simulations Comparison Project", 01/22/15

- **Astronomy Colloquium**, *Seoul National University, invited*, “Galaxy Formation Simulations in the High-resolution Era: Success and Challenge”, 12/10/14
- **Einstein Fellows Symposium 2014**, *Harvard-Smithsonian Center for Astrophysics*, “Challenges in Numerical Galaxy Formation and the AGORA Initiative”, 10/28/14
- **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”, 08/15/14
- **Carnegie Observatories Colloquium Series**, *Carnegie Observatories, invited*, “Rethinking Galaxy Simulations in the High-resolution Era”, 03/18/14
- **Santa Cruz Galaxy Formation Workshop+2nd AGORA Workshop**, *UC Santa Cruz*, “The AGORA Project: Initial Conditions and the Proof-of-concept Test”, 08/16/13
- **Cosmology Seminar**, *Stanford University, invited*, “Rethinking Galaxy Simulations in the High-resolution Era”, 05/20/13
- **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”, 08/17/12
- **Workshop for Korean Young Cosmologists**, *Korea Astronomy and Space Science Institute, invited*, “High-resolution Galaxy Formation with Massive BHs and Radiating Star Clusters”, 06/25/12
- **SLAC Association for Student Seminars**, *SLAC National Accelerator Laboratory*, 05/11/11
- **KIPAC Tea Talk**, *SLAC National Accelerator Laboratory*, “Galaxy Formation and Mergers with Self-consistently Modeled Stars and Massive BHs”, 04/08/11
- **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?”, 12/10/10
- **Computational Astrophysics Group Seminar**, *U. Chicago*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 12/03/10
- **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”, 11/15/10
- **Theoretical Astrophysics Center Seminar**, *UC Berkeley*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/25/10
- **Cosmoclub Seminar**, *UC Santa Cruz*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/18/10
- **Friday Astro Lunch**, *UC Santa Barbara*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/15/10
- **Astronomy Tea Talk**, *Caltech*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs: Towards An Unabridged Understanding of Their Coevolution”, 10/11/10
- **LCA Group Seminar**, *UC San Diego*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs”, 09/30/10
- **Santa Cruz Galaxy Formation Workshop**, *UC Santa Cruz*, “Galaxy Formation with Self-consistently Modeled Stars and Massive BHs”, 08/17/10
- **HIPACC Summer School on Galaxy Formation**, *UC-HIPACC*, “Galaxy Formation using Enzo with Properly Modeled Stars and Massive BHs”, 07/28/10

- **Santa Cruz Galaxy Formation Workshop**, *UC Santa Cruz*, “Galaxy Mergers and Evolution with Adaptive Mesh Refinement”, 08/19/09
- **Cosmology In Northern California Meeting (CINC09)**, *UC Santa Cruz*, “Galaxy Mergers and Evolution with Adaptive Mesh Refinement”, 05/15/09
- **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”, 05/03/09
- **JILA Astrophysics Lunch**, *CU Boulder*, “Galaxy Mergers with Adaptive Mesh Refinement”, 05/01/09
- **Bay Area Star Formation Workshop**, *Stanford University*, “Galaxy Mergers with Adaptive Mesh Refinement”, 11/14/08
- **KIPAC Tea Talk**, *SLAC National Accelerator Laboratory*, “Galaxy Mergers with Adaptive Mesh Refinement”, 11/07/08
- **KIPAC Tea Talk**, *Stanford University*, “Simulating Galaxies on Adaptive Mesh Refinement”, 04/24/07