Abraham Loeb, Ph.D.
Biographical Sketch

Professional Preparation

The Hebrew University of Jerusalem	Physics and Mathematics	B.Sc	1983
The Hebrew University of Jerusalem	Physics	M.Sc.	1985
The Hebrew University of Jerusalem	Physics	Ph.D.	1987

Appointments

2012-	Frank B. Baird, Jr. Professor of Science, Harvard University
2011-	Chair, Astronomy department, Harvard University
2007-	Director, Institute for Theory & Computation (ITC), Harvard University (http://www.cfa.harvard.edu/itc/)
1997-	Professor of Astronomy, Harvard University
1995-1996	Associate Professor, Astronomy Department, Harvard University.
1993-1995	Assistant Professor, Astronomy Department, Harvard University.
1988-	Long-term member, Institute for Advanced Study, Princeton.

Honors

2013 Miegunyah Distinguished Visiting Fellowship, University of Melbourne, Australia
2013 Chambliss Astronomical Writing Award by the American Astronomical Society, for the book "How Did the First Stars and Galaxies Form?" (2010)
2012 Selected among "The 25 Most Influential People in Space" by TIME Magazine
2012 Elected member of the American Academy of Arts & Sciences
2012 Galileo Galilei Chair (Cattedra Galileiana) Award, Scuola Normale Superiore, Pisa, Italy
2012 Hoopes Prize in undergraduate education for Senior thesis of Marion Dierickx
2012 Eric Keto Prize in Theoretical Astrophysics for PhD thesis of Laura Blecha
2011 Sackler Lecturer in Astronomy, Leiden Observatory, Netherlands
2011 Las Cumbres Observatory Prize Lecturer in Astrophysics, UC Santa Barbara
2009/10 Director of the Jerusalem Winter School in Theoretical Physics
2009 Distinguished Visiting Scientist at the Carnegie Observatories, Pasadena
2008 Invited speaker at the annual symposium of the Miller Institute, UC Berkeley
2008 Cover story of Smithsonian magazine about black holes, and cover story of ASTRONOMY magazine about the future collision between the Milky-Way and Andromeda
2007 Inaugural Australian Institute of Physics (AIP) End of Year Lecturer
2007 Paper on Milkomeda (arXiv:0705.1170) was selected as one of the top 10 space stories by ASTRONOMY magazine
2007/8 Australia-Harvard Distinguished Fellow
2007 Merle Kingsley Distinguished Visitor at the California Institute of Technology (Caltech)
2006/7 John Bahcall Lecturer at Tel Aviv University University
2006 Salpeter Lecturer at Cornell University

2006 SAAS-Fee Lecturer on "The First Light". Ten lectures summarized in a review of 158 pages, appeared in a book format (astro-ph/0603360).
2006 Robert J. Trumpler Award of the Astronomical Society of the Pacific for the PhD thesis of Steven Furlanetto
2004- Distinguished Visiting Professorship at the Faculty of Physics and the Einstein Center for Theoretical Physics, Weizmann Institute of Science
2003 Einstein Minerva fellow, Physics Faculty, Weizmann Institute
2002 John Simon Guggenheim Memorial Foundation Fellow
2001 Prof. Dror Sadeh Memorial Lecturer at Tel Aviv University
1999 Bergmann Memorial Award of the US-Israel Binational Science Foundation
1996 Hoopes Prize in undergraduate education for Senior thesis of P. Young
1987 The Kennedy Prize, Hebrew University of Jerusalem
1985 "Best M.Sc. Student" award of the Faculty of Science of the Hebrew University of Jerusalem (summa cum laude)
1980 Participant in the national elite project "Talpiyot", Israel

Public Service

2014 Member, Dean's Faculty Resources Committee, Faculty of Arts & Sciences, Harvard University
2014 Guest member, Editorial board, Annual Reviews of Astronomy & Astrophysics
2013–2014 Physical Sciences Chair, Review Committee of Science Graduate Programs, Harvard University
2013– Member, Allston Academic Planning Committee, Harvard University
2013– Member, Star Family Challenge Committee, Harvard University
2011- Head of Astrophysics, Editorial Board, Scientific Reports, Nature Magazine
2011-2014 Member, International Advisory Board, Publications of the Astronomical Society of Australia
2009– Editor, Journal of Cosmology and Astroparticle Physics (JCAP)
2008–2010 Executive board for the Energetic X-ray Imaging Survey Telescope
2008–2010 Science Working Group for the JANUS GRB Mission
2008– Science Working Group for the Lunar Radio Observatory
2008/9 Chair, selection committee of the Dan David Prize in cosmology
2005–2008 Science Working Group for the Cosmic Inflation Probe
2005– Science Working Group for the Murchison Wide-Field Array
2000– Chair of the biennial Harvard-Smithsonian Conference Series in Theoretical Astrophysics, sponsored by Raymond and Beverly Sackler. The first conference on "The First Generation of Cosmic Structures" was held in May 2000 (http://cfa-www.harvard.edu/apconf/). The second conference on "Gamma-Ray Bursts: The Brightest Explosions in the Universe" was held in May 2002 (http://cfa-www.harvard.edu/grbconf/). The third conference on "Astrophysics of Planetary Systems" was held in May 2004 (http://www.cfa.harvard.edu/apsconf/). The fourth conference on "Nuclear Black Holes in Galaxies" was held in May 2006 (http://cfa-www.harvard.edu/bh2006/). The fifth conference on "21cm Cosmology" was held in May 2008 (http://www.cfa.harvard.edu/events/2008/cos2008/). The sixth conference on "Dynamics from the Galactic Center to the Milky-Way Halo" was held

in May 2010 (http://www.cfa.harvard.edu/events/2010/dyn/). The seventh conference on "Testing General Relativity with Astrophysical Systems" was held inMay 2012 (http://www.cfa.harvard.edu/events/2012/sackler). The eighth conference on "Debates of the Nature of Dark Matter" was held in May 2014 (http://www.cfa.harvard.edu/events/2014/sackler).

1999–2000 Panel on Ultraviolet, Optical, and Infrared Astronomy from Space of the Astronomy and Astrophysics Survey Committee
1998–2000 Science Working Group for the Generation-X Space Telescope
1997–2000 Science Working Group for the Next Generation Space Telescope

Synergistic Activities

- "How Did the First Stars and Galaxies Form?" Santa Barbara Museum of Science (May 2010); featured at http://www.youtube.com/watch?v=nGM_stH07-Q
- "Portrait of a Black Hole", Scientific American. (Dec. 2009)
- "Illuminating Black Holes", Smithsonian Magazine cover story (April, 2008)
- "The Dark Ages of the Universe", Scientific American, (Nov. 2006)
- "Let There Be Light", Time magazine cover story, 9/4/06 issue

Collaborators and Other Affliations

Recent Senior Collaborators and Co-Editors: Rennan Barkana (Tel Aviv U.), Avery Broderick (University of Waterloo), Volker Bromm (U. Texas), Steve Furlanetto (Yale), Lars Hernquist (Harvard), Dan Maoz (Tel Aviv U.), Ruth Murray-Clay (Harvard-Smithsonian CfA), Mark Reid (Harvard-Smithsonian CfA), Eli Waxman (Weizmann Institute), Stuart Wyithe (Melbourne), Nico Yunes (Montana), Matias Zaldarriaga (IAS)

Graduate Advisors and Postdoctoral Sponsors:
Graduate Advisors: Prof. Lazar Friedland and Prof. Shalom Eliezer
Principal Postdoctoral Sponsor: John Bahcall

Thesis Advisor and Postgraduate-Scholar Sponsor:

Graduate students advised: 29
Postdoctoral Scholars advised: 16

Graduate Students (in chronological order)
Daniel Eisenstein (Hubble fellow, Professor at Univ. of Arizona, now tenured Professor at Harvard Univ.), Zoltán Haiman (Hubble fellow, Professor at Columbia Univ.), Rosalba Perna (Harvard Junior fellow, Princeton Spitzer fellow, Professor at U. Colorado), Eric Woods (graduated, teaching), Ravi Pilla (Columbia Univ.), Alexandre Refregier (Sacklay, France), David Heyrovsky (Charles Univ.), XiaohuWang (graduated), Pinaki Chatterjee (graduated), Steven Furlanetto (prize postdoctoral fellowship at Caltech, Professor at UCLA, received the Trumpler award in 2006 for his PhD thesis), Loren Hoffman (Lindheimer postdoctoral fellow, Northwestern, postdoc at Hebrew Univ.), Daniel Babich (prize postdoctoral fellowship, Caltech), Ryan O'Leary

(Einstein fellow, UC Berkeley), Joseph Munoz (Postdoc fellow, UCLA), Bence Kocsis (Postdoc fellow, IAS), Laura Blecha (Einstein fellow, UMaryland), Idan Ginsburg (Visit. Asst. Prof, Stonehill College), Eli Visbal (Postdoc fellow, Columbia), Genevieve Shattow (Swinburne), Nicholas Stone (Postdoc fellow, Columbia), Douglas Rubin (Harvard Physics), Tony Pan (Invention Science Fund), Jonathan Bittner (COO, Splitwise), Gongjie Li (Harvard Astronomy), Natalie Mashian (Harvard Physics), Marion Diereckx (Harvard Astronomy), Pierre Christian (Harvard Astronomy), Anna Ijjas (Princeton, Rutgers), Anna Patej (Physics), Xiawei Wang (Astronomy)

Postdoctoral fellows (in chronological order)
Anne Thoul (Prof. at Univ. of Liege, Belgium), Volker Bromm (Prof. at Univ. of Texas), Stuart Wyithe (Prof. at Univ. of Melbourne), Avery Broderick (ITC fellow, University of Waterloo), Mark Dijkstra (ITC fellow, MPA Garching), Jonathan Pritchard (Hubble fellow, Lecturer in Astrostatistics at Imperial College), Uri Keshet (Fermi/Einstein fellow, Ben-Gurion University), Yuval Birnboim (Rothschild fellow, The Hebrew University), Bence Kocsis (Postdoc fellow, IAS), Charlie Conroy (Harvard Society of Fellows, Asst. Prof. Harvard Univ.), Yue Shen (Clay fellow, Carnegie), Nico Yunes (Einstein fellow, Asst. Prof. Montana State University), Asaf Pe'er (Fermi postdoc, UCollege Cork), Smadar Naoz (ITC, Hubble fellow, Asst. Prof. UCLA), Yan-fei Jiang (Einstein Fellow), Lorenzo Sironi (Einstein fellow), Konstantine Batygin (Prof. Caltech), Sayan Chakraborti (Harvard Society of Fellows), James Guillochon (Einstein Fellow), Blakesley Burkhart (Einstein Fellow), Cora Dvorkin (Hubble Fellow), Jill Naiman (NSF Fellow).

Books:
Loeb, A., & Furlanetto, S., "The First Galaxies in the Universe", Princeton Series in Astrophysics, Princeton University Press (2013).
Loeb, A. "How Did the First Stars and Galaxies Form?", Frontiers in Physics Series, Princeton University Press (2010).
Loeb, A., Ferrara, A., & Ellis, R. S. "First Light in the Universe", SAAS-Fee winter school, Springer, New York (2008).

Selected Papers: (466+ Published Papers, for details see: *http://www.cfa.harvard.edu/~loeb***)**
Gould, A. & Loeb, A., "Discovering Planetary Systems Through Gravitational Microlenses", ApJ, 396, 104 (1992).
[*first detailed discussion of a novel method for detecting planets*]

Loeb, A., "Direct Measurement of Cosmological Parameters from the Cosmic Deceleration of Extragalactic Objects", ApJL, 499, 111 (1998).
[*detecting cosmic expansion in real time; the so-called "Sandage-Loeb Test"*]

Medvedev, M.V., & Loeb, A., "Generation of Magnetic Fields in the Relativistic Shock of Gamma-Ray Burst Sources", ApJ, 526, 697 (1999).
[*first suggestion of the most popular mechanism for generating magnetic field in GRB shocks*]

Bromm, V., & Loeb, A., "Formation of the First Supermassive Black Holes", ApJ,596, 34 (2003). [*first suggestion of a highly popular scenario for the seeds of quasars*]

Loeb, A., & Gaudi, B. S., "Periodic Flux Variability of Stars due to the Reflex Doppler Effect Induced by Planetary Companions", ApJL, 588, L117 (2003).
[*first paper to suggest a novel method for detecting planets photometrically through Doppler beaming; the method was used to discover a new planet in 2013*]

Pfahl, E. & Loeb, A. "Probing the Spacetime Around SgrA* With Radio Pulsars", ApJ, 615, 253 (2004).
[*first paper to study the use of pulsars in testing GR near SgrA*; last year the first pulsar (magnetar) was discovered in that neighborhood*]

Loeb, A., & Zaldarriaga, M. "Measuring the Small-Scale Power Spectrum of Cosmic Density Fluctuations Through 21 cm Tomography Prior to the Epoch of Structure Formation", Phys. Rev. Lett., 92, 211301 (2004).
[*first paper to consider the 21-cm fluctuations during the dark ages, before the first stars were born*]

Loeb, A., & Waxman, E. "The Cumulative Background of High-Energy Neutrinos", JCAP, 5, 3 (2006).
[*first paper to suggest a high-energy neutrino background from starburst galaxies. A neutrino flux exactly in agreement of the prediction in this paper was reported by Ice-Cube recently*]

Wyithe, S., & Loeb, A. "The 21cm Power Spectrum After Reionization", MNRAS397, 1976 (2008).
[*first paper to suggest that the 21-cm line can be used to map the distribution of galaxies on large scales after reionization (without resolving galaxies individually). By now, this method is labeled "intensity mapping", and there are funded projects to seek detection of this signal*]

Pritchard, J., & Loeb, A. "Constraining the Unexplored Period Between Reionization and the Dark Ages with Observations of the Global 21-cm Signal", Phys. Rev. D, 82, 3006 (2010).
[*first paper to calculate in detail the global 21-cm signal (the spectrum of the sky) throughout cosmic history. There are several experiments aiming to detect this signal*]

Ciardi, B., & Loeb, A. 2000, ApJ, 540, 687; "Expected Number and Flux Distribution of Gamma-Ray Burst Afterglows with High Redshifts"
[*first paper to suggest that GRB afterglows can be detected from high redshifts*]

Broderick, A.E., & Loeb, A. 2005, MNRAS, 363, 353; "Imaging bright-spots in the accretion flow near the black hole horizon of Sgr A"
[*first paper to discuss the potential of imaging hot spots around SgrA*, which helped motivate the Event Horizon Telescope*]

Broderick, A.E., & Loeb, A. 2009, ApJ, 697, 1164; "Imaging the Black Hole Silhouette of M87: Implications for Jet Formation and Black Hole Spin"
[*first paper to quantify the potential of imaging the black hole silhouette in M87*]