

# LISA KALTENEGGER (PhD. MSc. MEng.)

Harvard-Smithsonian Center for Astrophysics, 60 Garden Str. MS20, Cambridge, MA 02138, USA

## EDUCATION

<b>Ph.D.</b> , Astrophysics, Karl Franzens Univ Graz / ESTEC	<i>graduated summa cum laude</i>	2005
"Search for Extraterrestrial Planets: DARWIN mission Target Stars & Array Architectures"		
<b>M.Sci.</b> , Astrophysics, Karl Franzens Univ Graz/IAC	<i>graduated summa cum laude</i>	1999
"Extrasolar Planet Search: Formation of Extrasolar Planets and Detection Methods"		
<b>M.Eng.</b> , Physics & Engineering, Univ. of Technology Graz	<i>graduated summa cum laude</i>	2001
"Application of Optical Tweezers in Medicine & Biology"		

## EMPLOYMENT & RESEARCH EXPERIENCE

Research Associate, Harvard Astronomy Department	2009- current
Lecturer, Harvard Astronomy Department	2008- current
Postdoctoral Fellow SAO, Harvard Smithsonian CfA, USA	2005 – 2009
Consultant to ESA Science Dep. AURORA Technolgy: Netherlands	2003 – 2004
Young Engineer ESA/ESTEC: Dep. of Future Projects, Netherlands	2001 - 2002
Research fellow, Georgia Institute of Technology, USA	2000 – 2001
LIGO 2000 Summer Undergraduate Research Projects, California Inst. of Technology, USA	2000
United Nations (UNO), Conference moderator, Austria	1999
JHU 1999 Summer Undergraduate Research Projects, JHU, USA	1999
Research fellow, Instituto de Astrofisica de Canarias (IAC), Spain	1998 – 1999

## AWARDS & HONORS

Conrad Festa Prize lecture, College of Charleston	2010
Tinsley Visiting Scholar, University of Texas Austin	2009
America's Young Innovator in Arts and Science Award 2007, Smithsonian Magazine	2007
P. Hertelendy Award and Prize Lecture for Outstanding Young Scientist at CfA 2007	2007
Austrian National Award for Outstanding Academic Achievements	2005
Highest Austrian Academic Honor SubAuspices (awarded personally by Austrian president)	2004
National Award of the Ministry of Educations for Outstanding Academic Achievement(PhD)	2004
National Award of the Ministry of Educations for Outstanding Academic Achievement(MSc)	2000
Awards of Academic Achievement, Tech. Univ. Graz & KF Univ Graz	1996 through 2001

## INTERNATIONAL SCIENCE PANELS

NASA Extrasolar Planet Analysis Group - Executive Council	2009 – current
Lead of the Habitability Group (Pale Blue Dot Initiative)	2008 – current
Co-I, NASA Astrobiology Institute: Advent of Complex Life	2009 – current
ISSI team "Evolution of Exoplanet Atmospheres and their Characterization"	2007 – current
TPF-I: Science Working Group: invited external expert	2005 – current
Darwin Science Advisory Committee: member as part of ESA & external expert	2002 – current

## PRESS RELEASE

"Avatar's moon Pandora could be real" <a href="http://www.cfa.harvard.edu/news/2009/pr200925.html">http://www.cfa.harvard.edu/news/2009/pr200925.html</a> ,	Dec09
"Finding Twin Earths: Harder Than We Thought" <a href="http://www.cfa.harvard.edu/news/2009/pr200909.html">http://www.cfa.harvard.edu/news/2009/pr200909.html</a>	Mar09
"3 Top Young CfA Astronomers Honored" <a href="http://www.cfa.harvard.edu/press/2007/pr200730.html">http://www.cfa.harvard.edu/press/2007/pr200730.html</a>	Nov 07
"Astronomers reveal first Alien ID chart" <a href="http://www.cfa.harvard.edu/press/2006/pr0625.html">http://www.cfa.harvard.edu/press/2006/pr0625.html</a>	Oct 06

## SPACE MISSION PROPOSAL TEAM MEMBER

Darwin (2007), SEE-COAST(2007), ASTRO(2007), Terrestrial Planet Finder – Interferometer

## EDITORIAL BOARD OF INTERNATIONAL JOURNALS

Astrobiology (editorial board), Encyclopedia of astrobiology (field editor)

## CONFERENCES Organizer

---

### Scientific Organizing Committee

EGU (Habitability and Characterization of Exoplanets)	May 2010
DPS (Division for Planetary Sciences) 2009, Puerto Rico	Oct. 09
Goldschmidt - Dynamics of Early Earth-Like Planets and Super-Earths, Davos	July 09
Cosmic Cataclysms and life ESLAB 08, Frascati, Italy	Nov. 08
Super Earth Workshop, Aspen, USA	Aug. 08
Goldschmidt - Early Life, geochemical and dynamical aspects, Vancouver	July 08
AbSciCon 2008, Santa Clara, CA: Plenary Future Missions and what they can detect	April 08
AbSciCon 2008, Santa Clara, CA: Habitability on Super Earths	April 08
Physics and Astrophysics of Planetary Systems, Les Houches School, France	Aug. 08
European Planetary Science Congress, Berlin: Biomarkers and their detectability	Sept 07
European Planetary Science Congress, Potsdam: Concepts of Habitability	Sept 06
LOC: "Transiting Planets", IAU Symposium 253, Cambridge, USA	May 08
Journal club: Harvard EPS and CfA Journal club (weekly interdisciplinary meeting)	07/08

### **MEDIA COVERAGE**

---

CNN-I, USA Weekend, The Economist, Smithsonian Magazine, BBC, New Scientist, USA-Today, Christian Science Monitor, AP, El Mercurio, Superinteressante, Spiegel, Die Zeit, web-based sites

#### **Interviews:**

CNN-I, World Connect (TV)	Jan 10
WJY, History Channel (TV)	May 09
NOVA (TV) (Discovery Channel)	Oct 08
WUML 91.5 Stargazer Segment (Radio)	April 08
BBC World News (Radio)	Oct 07
'Eye on the sky' SAO Project (webbased TV interview)	Feb 07
Channel 7 News (TV)	Nov 06
National Geographics, New Scientist (podcasts)	Nov 06

### **Invited speaker**

---

#### International Conferences

AbGradCon, "SuperEarths and Life"	June 2010
EGU, Austria, "Characterizing Atmospheric Biomarkers"	May 2010
ESF, Austria, "Biomarkers in planetary atmospheres"	April 2010
CAVLI Institute, "Spectral characterization: SuperEarths to Earths"	April 2010
AstroBio2010, Chile, "Spectral Characterization of exoplanet Atmospheres"	Jan 2010
SOCHIAS, Chile, "Extrasolar planetary Atmospheres"	Jan 2010
Naples, Italy, 21st Colloquium on High Res. Mol. Spectroscopy, "Spectral Evolution"	Aug 09
ESA/ASA summerschool 2009, Austria, "Atmospheric Biomarkers"	July 09
HSTcl Baltimore, USA, "Search for Habitability on exoplanets"	May 09
EGU, Vienna, "Spectral Evolution of Habitable Planets"	April 09
Exeter Univ. workshop, UK, "Modeling exoplanet atmospheres"	Sept 08
ESO Elba 2008, Italy, "Atmospheric Biomarkers and their detectability"	Sept 08
HITRAN conference, USA, "Detectability and Challenges on Atmospheric Biomarkers"	July 08
Nantes Super-Earth Conf., France, "Atmospheres of Super-Earths"	June 08
AbSciCon 2008, USA, "Habitability of Super Earths"	April 08
Les Houches Winter School: "Biomarkers on exoplanets"	Feb 08
Max Planck Symposium, Berlin: "Characterizing the Pale Blue Dot"	Feb 08
Darwin mtg, IAS, Paris: "Comparative planetology and the search for life"	Dec 07
European Planetary Science Congress, Berlin: "Biomarkers and their detectability"	Sept 07
Alpbach Summer School, Austria, "Signature of life on extrasolar planets"	July 07
ESO symposium, Santiago de Chile: "Exoplanet search, Biosignatures, and targets"	March 07
3 <sup>rd</sup> International TPF/Darwin Workshop, L.A.: "Evolution of Earth's atmosphere"	Nov. 06
European Planetary Science Congress, Berlin: "Evolving Earth"	Sept. 06

Pale Blue Dot III, Chicago: "Techniques and future observation of terrestrial planets"	Sept. 06
ESOF2006, Munich: "Possible spectra signature of life in planetary atmosphere"	May 06
AbSciCon 2006, D.C.: "Future missions on extrasolar planets and what they can tell us"	March 06
ISSI, Bern: "Evolution of Biomarkers over geological timescale"	Feb 06
COSPAR, Paris: "Darwin and Search for Exo-terrestrial Planets"	July 04

### Invited Colloquia

'Spectral evolution of an Earth-like planet, Search for signs of life, Future space missions'

Princeton (D. Spergel)	May 10
Univ. Vienna (E. Lohinger)	May 10
Univ. Montreal (R. Lamontagne)	April 10
Wesleyan Univ. (S. Rethfield)	Nov 09
Univ. Texas Austin (N. Evans)	May 09
Dartmouth (B. Chabey)	Jan 09
Univ. Heidelberg (R. Klessen)	May 08
Univ. Colorado (F. Bagenal)	April 08
CfA (Ch. Alcock)	Sept 07
Michelson Science Center (G. van der Belle)	May 05
ESTEC (M. Fridlund)	Sept 04

### Invited Seminars

Princeton (E. Turner)	May 09
Brown Univ. (R. Cook)	Sept 09
Univ. Oxford (N. Thatte)	June 09
MIT (S. Seager)	June 09
Univ. Texas San Antonio (E. Schegel)	Feb 09
Univ. Texas Austin (J. Scalo)	Feb 09
Open Univ. (C. Cockell)	Dec 08
Univ. Oxford (P. Read)	Sept 08
CfA OIR seminar (R. Schild)	April 08
CfA ITC seminar (L. Yuexing)	March 08
Univ Heidelberg (R Somerville)	March 08
Univ. Arizona (C Impey)	Feb 08
Univ. Bordeaux (V. Wakelam)	Dec 07
Univ Vienna (E. Lohinger)	Dec 07
Arizona State University (K. Hodges)	March 07
Museum of Natural History (B. Oppenheimer)	Feb 07
Univ. of Colorado., Boulder (S. Raymond)	Jan 07
CalTech, L.A. (Y. Yung)	Jan 07
Observatory Geneva, Geneva (M. Mayor)	Dec 06
Observ de Paris, Meudon (J. Schneider)	Dec 06
ENS Lyon, Lyon (F. Selsis)	Dec 06
Univ. de Paris Sur, Paris (A. Leger)	Nov 06
Penn State Univ. (J. Kastings)	May 06
CfA, OIR (W. Traub)	April 06
Univ. of Vienna (R. Dvorak)	Feb 06

### Speaker:

Frascati ESLAB conf 2008, Italy, "Evolution of an Earths-like planet	Dec 08
AAS, Seattle, 'Evolution of biomarkers on Earthlike planets'	Jan 07
6th European Workshop on Astrobiology, "Evolving Earth over time"	Oct 06
European Geophysical Union, "Evolution of atmospheric biomarkers over Earth's history	April 06
AbSciCon, 2006, D.C., "Search for Atmospheric Biomarkers & their Evolution over Time"	March 06
IAUC200, Nice, "Biomarkers and their evolution over time"	Nov 05
NAI 2005 mtg, "Darwin and the search for life"	April 05
SPIE: "Requirements on the stellar rejection for the Darwin mission"	July 04

## TEACHING

---

### Lecturer

Developed:

- High quality on-line calculation training lectures, that discuss the physical nature and evolution of stars and planets in our Milky Way Galaxy, and how observing stars in distant galaxies enables us to map the Universe.
- Set the material in context with current day event and culture.
- Interactive teaching concepts and experiments
- Weekly quizzes that probe the understanding of scientific concepts
- Midterm and Final exams that develop scientific thinking and understanding
- Innovative interactive telescope activities (daytime and evening sessions)

Graded quizzes, exams and lab reports

Gave feedback that develops the scientific thinking of non-science students further.

Provided support to students in a challenging practical environment of using telescopes.

Interacted with students on any problems and questions related to the course

#### Science A-36 : Observing the Sun and the Stars:

**Fall 2008, Fall 2009**

Harvard Core Course and Laboratory Session (co-teach with J. Grindley)

Scope: Direct observations of the Sun and the stars, to learn how we can understand the Galaxy and the Universe from stars. In small sections, students conduct hands-on telescopic observations of the Sun and stars using modern instrumentation to explore their energy output, relative distances, temperatures, composition, and their life histories.

#### Astronomy 1 The Astronomical Universe (co-teach w. S. Steel)

**Spring 2008**

Scope: Introductory course for non-science concentrators, which provides a basic understanding of our Universe. Basic principles of physics & observational astronomy using elementary algebra.

#### Science A-54. Life as a Planetary Phenomenon (2 classes for D. Sasselov)

**Spring 2008**

Scope: This course focusses the relationship between life and the planet on which it resides and the scientific quest to understand where life might thrive beyond Earth.

### Advisor

Sarah Rugheimer (graduate student Harvard)

2008-current

Wade Henning (undergrad EPS)

2009-current

Roger Fu (undergrad EPS)

2009-current

Leah Kilvert (Undergraduate Summer Project SAO)

2008

### Visiting Professor

Ecole Normale Supérieure de Lyon (group of F. Selsis)

Nov/Dec 06

Univ. of Arizona Astrobiology Lecture series (C Impey)

Feb 08

MIT Teachers workshop – How to use Astronomy in the classroom

Sept 05

#### Team Tutor: Team Management and Group Leadership

July 2009, 2007, 2005

ESA/ASA Summerschool Alpbach (15 students, 2 week intense course)

Scope: 2 week intense design course for European science/engineering graduate and undergraduate students to provide new ideas & mission concepts for small satellites.

- Building the team, leading discussions
- Initiating brainstorming and new design concepts
- Teaching main design and science key points
- Organizing the final report and 1 hour presentation of the mission by all students
- Teaching students how to interact in an international, interdisciplinary environment

## PROFESSIONAL ASSOCIATIONS

---

AAS, DPS, Europlanet Network, ISSI, CfA Women in Science, ÖWF (Austrian Space Forum)

## SERVICE IN THE SCIENCE COMMUNITY

---

NASA and NSF review panels, Referee: Astrobiology, Icarus, ApJ, A&A, Springer

## OUTREACH ACTIVITIES

---

### Scientific Advisor:

Exoplanets and beyond, CfA (bringing cutting-edge science into the K-12 classroom)	2008
Eye on the sky, CfA education department, dialogue with astronomers	2007
The Habitable Planet Project, Harvard (web based initiative for the classroom)	2007
Science at Stake: webbased Initiative for journalists and general public	2006 - current

### Public lectures

Dynamics of Planets Conference, CfA, USA "Exoplanets, an intriguing puzzle"	April 10
Public Lecture UC Santa Cruz, USA "Exoplanets& Life"	April 10
South Carolina Annual Astronomers Meeting, USA "SuperEarths and Life"	March 10
Bridging the Gap, Art & Science, storefront, NYC	Dec 09
Christmas Lecture, Open University,UK "Finding Other Worlds"	Dec 08
Boston Amateur Astronomers, Boston, USA: "Searching for the pPale Blue Dot"	Oct 07
Skyscrapers Astro Society,USA "How to find Fingerprints of Life on Exoplanets"	July 07
Willstone Highschool, 8 <sup>th</sup> grade, lecture at star party	March 07
CfA Public lecture, Boston, USA: "Epochs of Life"	Nov 06

## LANGUAGES

---

German: native      English,Spanish: fluent      Italian,Dutch: good      Portuguese, French:basic