

---

---

## Professor Sara Seager Massachusetts Institute of Technology

---

---

**Address:** Department of Earth Atmospheric and Planetary Science  
Building 54 Room 1718  
Massachusetts Institute of Technology  
77 Massachusetts Avenue  
Cambridge, MA, USA 02139  
Phone: (617) 253-6779 (direct)  
E-mail: seager@mit.edu

**Citizenship:** US citizen since 7/20/2010

**Birthdate:** 7/21/1971

---

### Professional History

---

**1/2007–present:** Massachusetts Institute of Technology, Cambridge, MA USA

- Class of 1941 Professor (1/2012–present)
- Professor of Planetary Science (7/2010–present)
- Professor of Physics (7/2010–present)

---

**1/2007–12/2011:** Massachusetts Institute of Technology, Cambridge, MA USA

- Ellen Swallow Richards Professorship (1/2007–12/2011)
- Associate Professor of Planetary Science (1/2007–6/2010)
- Associate Professor of Physics (7/2007–6/2010)
- Chair of Planetary Group in the Dept. of Earth, Atmospheric, and Planetary Sciences (2007–2015)

---

**08/2002–12/2006:** Carnegie Institution of Washington, Washington, DC, USA

- Senior Research Staff Member

---

**09/1999–07/2002:** Institute for Advanced Study, Princeton NJ

- Long Term Member (02/2001–07/2002)
- Short Term Member (09/1999–02/2001)
- Keck Fellow

---

### Educational History

---

1994–1999                      Ph.D. “*Extrasolar Planets Under Strong Stellar Irradiation*”  
Department of Astronomy, Harvard University, MA, USA

1990–1994                      B.Sc. in Mathematics and Physics  
University of Toronto, Canada  
NSERC Science and Technology Fellowship (1990–1994)

---

## Awards and Distinctions

---

### Academic Awards and Distinctions

2015	National Academy of Sciences Member
2013	MacArthur Fellow
2012	Raymond and Beverly Sackler Prize in the Physical Sciences
2007	Helen B. Warner Prize, American Astronomical Society
2004	Bok Prize in Astronomy, Harvard University

### Other

2013	Royal Astronomical Society of Canada, Honorary Member
2012	AAAS Fellow

### Media Recognition

2012	Time Magazine: one of the 25 Most Influential in Space
2011	Nature: Named in 2011 Top Ten
2008	Discover Magazine: Named in Best 20 under 40
2006	Popular Science Magazine: Named in Fifth Annual Brilliant Ten

---

## Prize Lectures and Visiting Positions

---

2016	•JPL Distinguished Visiting Scientist (7/2014–6/2016)
2015	•Sturm Lecture, Wesleyan University, CT •Mohler Prize Lecture, U. Michigan •Sackler Lecturer, IoA Cambridge, UK
2011	•Page-Barbour Lecturer, University of Virginia, VA •Salpeter Lecturer, Cornell University, NY
2010	•Biermann Lecturer, Max Planck Institute for Astrophysics, Garching, Germany •Foster-Hewitt Lecturer, Lehigh University, PA •Nova Lecturer, Netherlands
2009	•John Bahcall Lecturer, NASA: STScl and GSFC
2008	•Dr. H. Lyman Hooker Distinguished Visiting Professor, McMaster University, Canada • <i>Spitzer</i> Distinguished Visiting Scientist, Spitzer Science Center, CA

---

## Professional Societies

---

1999–present	American Physical Society
1999–present	American Astronomical Society
2007–2011	American Geophysical Union

---

## Selected Space Science Mission Activities

---

### Current

2010–present	Co-I TESS (a NASA Explorer Mission, launch 2017)
2008–present	PI ASTERIA (formerly ExoplanetSat) a prototype 6U CubeSat telescope)

### Past

2013–2015	Chair, NASA Probe Class External Occulter STDT
2011–2012	CDIO lead for REXIS (a NASA New Horizons Mission, launch 2016)

2007–2011	Participating Scientist NASA/Kepler (launched 3/2009)
2008–2011	Co-I NASA/EPOXI Discovery Mission of Opportunity (formerly the NASA Deep Impact Spacecraft)
2008–2009	Deputy Mission Scientist for TESS, a NASA/SMEX proposal through Phase A
2003–2008	Support Scientist, CSA/MOST (Microvariability and Oscillations of Stars (MOST) microsatellite) (launched June 2003)
2004–2006	NASA TPF Scientific and Technology Definition Team
2002–2004	NASA TPF Scientific Working Group
2000–2001	Ball Aerospace TPF Architecture Study Team

---

## Selected Committee Membership

---

### **Current**

2013–2015 Co-Chair, Beyond JWST Committee (AURA)

### **Past**

2009–2013 James Webb Space Telescope Advisory Committee (JSTAC)  
 2008–2012 Spitzer Science Center Oversight Committee (Spitzer Space Telescope)  
 2007–2010 National Academy of Sciences NRC Committee on the Origin and Evolution of Life  
 2006–2008 Space Telescope Science Institute (HST) Visiting Committee  
 2007–2008 NASA/NSF Exoplanet Task Force  
 2005 James Webb Space Telescope Science Assessment Team  
 2004–2005 National Academy of Sciences Astronomy and Astrophysics Mid Course Review  
 2004–2005 NSF Optical and Infrared Long Range Planning Committee  
 2002–2005 Chair, NASA Astrobiology Astronomy Focus Group  
 2002 NASA Origins Roadmap Committee

---

## Conference Scientific Organizing Committees

---

2015 •"ExoClimes", Kona, HI  
 2013 •"Search for Life Beyond the Solar System", Tucson, AZ  
 2012 •"Characterizing and Modeling Extrasolar Planetary Atmospheres: Theory and Observations", Heidelberg, Germany  
 2011 •"Exploring Strange New Worlds: from Giant Planets to Super Earths", Flagstaff, AZ  
 2010 •Third Workshop Stellar Observation Network Group (SONG), China  
 2009 •"Towards Other Earths", Portugal  
 •"Pathways Towards Habitable Planets", Barcelona, Spain  
 2008 •"Characteristics and Habitability of Super Earths," Aspen Center for Physics,  
 •"Extrasolar Super-Earths," Nantes, France  
 •"Transiting Planets," International Astronomical Union (IAU) Symposium 253, Boston  
 2006 •"The 4<sup>th</sup> International TPF/Darwin Workshop," Pasadena, CA,  
 2005 •"Direct Imaging of Exoplanets," IAU Colloquium 200, France  
 2003 •14th Annual Maryland Astrophysics Conference: "The Search for Other Worlds," MD  
 2002 •Co-Chair for "Scientific Frontiers in Extrasolar Planet Research," Washington DC

---

## Current Research Group Members

(EAPS = MIT Dept. of Earth, Atmospheric, and Planetary Sciences; Physics = MIT Dept. of Physics; Aero-Astro = MIT Dept. of Aeronautical and Astronautical Engineering

\*= co-supervised)

### Exoplanet Characterization (Primarily Computer Modeling and Data Interpretation)

<b>Name</b>	<b>Dept.</b>	<b>Position</b>	<b>Topic</b>
William Bains	EAPS	Consultant	Biosignatures
Julien de Wit	EAPS	Postdoc	Exoplanet Atmosphere Modeling
*Alexandria Johnson	EAPS	Postdoc	Cloud Experiments
Stephen Messenger	EAPS	Grad Student	Exoplanet Atmospheres
Zhuchang Zhan	EAPS	Grad Student	Exoplanet Spectra

### Space Engineering Research (Hardware, Software, and Simulations)

<b>Name</b>	<b>Dept.</b>	<b>Position</b>	<b>Topic</b>
Mary Knapp	EAPS	Grad Student	Science, Camera, Systems
Akshata Krishnamurthy	Aero-Astro	Grad Student	Systems, Structures
Jared Atkinson	EAPS	Grad Student	Geo and Space Eng. For Asteroid Mining

## Past Research Group Members

(EAPS = MIT Dept. of Earth, Atmospheric, and Planetary Sciences; Physics = MIT Dept. of Physics; Aero-Astro = MIT Dept. of Aeronautical and Astronautical Engineering)

### Past Postdoctoral Fellows

<b>Name</b>	<b>Dept.</b>	<b>Current Position</b>
Vlada Stamenkovic	EAPS/SNS Fellow	Simons Foundation Fellow (at JPL)
Andras Zsom	EAPS/DFG Fellow	Unknown
Nikole Lewis	EAPS/Sagan Fellow	STScI Scientist
Brice Demory	EAPS	Staff at IoA, Cambridge, UK
Alessandra Babuscia	MIT Aero-Astro	JPL Staff
Diana Valencia	MIT EAPS Sagan Fellow	Faculty at U. of Toronto
Margaret Turnbull	Carnegie NRC Fellow (2004–2006)	GSI
L. Jeremy Richardson	GSFC NRC Fellow (2004–2006)	Unknown
Kaspar von Braun	Carnegie Fellow (2002–2005)	MPIA

### Past MIT PhD Students

<b>Name</b>	<b>Dept.</b>	<b>Current Position</b>
Ben Corbin	Aero-Astro (2012-2015)	
Chris Pong	Aero-Astro (2010-2014)	Staff at JPL
Matthew Smith	Aero-Astro (2010-2014)	Staff at JPL
Bjoern Benneke	Aero-Astro (2010–2013)	Postdoc at Caltech
Renyu Hu	EAPS (2009–2013)	Hubble Fellow at JPL
Leslie Rogers	Physics (2007-2012)	Hubble Fellow at Caltech
Nikku Madhusudhan	Physics (2008–2009)	Lecturer at Cambridge, UK

### Past Masters or Other PhD Students

<b>Name</b>	<b>Dept.</b>	<b>Current Position</b>
Niraj Inamdar	Mech E./EAPS	Grad Student/EAPS
*Jameson Nash	Aero-Astro Masters	MIT/Aero Astro
Rachel Bowens-Rubin	EAPS Masters	MIT/EAPS researcher
Luyao Li	EAPS Masters	Unknown
Thomas Beatty	Physics Masters (2008–2009)	Ohio State U. grad student
Ben Hood	PhD (11/2005–1/2007)	Industry

### ***Selected Past Undergraduate Research Students (\* = Senior Thesis)***

<b>Name</b>	<b>Dept. (year of position)</b>	<b>Current Position</b>
Zsuzsa Megyery	EAPS (2013)	
Becky Jensen-Clem	Physics (2010-2012)	Caltech graduate student
Sukrit Ranjan	Physics (2009)	Harvard graduate student
Ana-Maria Piso	Physics/EAPS (2011)	Harvard graduate student
*Sarah Gelman	EAPS (2009)	U. of Washington graduate student
*Li Zeng	Physics (2007–2009)	Harvard graduate student
Sonali Shukla	Carnegie Summer Intern (2005)	New York University grad student

---

### **Selected Recent Keynote or Plenary Talks at International Conferences**

---

2015	<ul style="list-style-type: none"><li>•Canadian Association of Physicists, Alberta, Canada</li><li>•IEEE, Big Sky, MT</li></ul>
2014	<ul style="list-style-type: none"><li>•The Search for Life Beyond the Solar System, Tucson, AZ</li></ul>
2010	<ul style="list-style-type: none"><li>•SPIE Plenary Talk, CA</li></ul>
2009	<ul style="list-style-type: none"><li>•Vatican Astrobiology Workshop, Italy</li></ul>
2008	<ul style="list-style-type: none"><li>•New Vision 400, Beijing, China</li><li>•COSPAR Plenary Talk, Montreal, PQ</li></ul>

---

### **Recent Selected Public Talks**

---

2015	TED	Vancouver	Canada
2014	CPSX distinguished public lecture	U. Western Ontario	ON
2013	RASC General Assembly	Lakehead University	Canada

---

### **Selected Scientific Publications (\*=Student or Postdoc in Seager's Research Group)**

For a full publication list see <http://seagerexoplanets.mit.edu/ftp/SeagerPublications.pdf>

*h*-index = 60. Citation count > 12,000. Number of publications > 270. Number of refereed publications > 160.

#### ***Selected highlights:***

**Seager, S.**, Bains, W. 2015, "The Search for Signs of Life at the Interface of Chemistry and Planetary Science", *Science Advances*, 1, 47.

Ferreira, D., Marshall, J., O'Gorman, P. A., **Seager, S.** 2015, "Climate at High Obliquity", *Icarus*, 243, 236-248.

**Seager, S.** 2014, "The future of spectroscopic life detection on exoplanets", *PNAS*, 111, 12634-12640.

\*de Wit, J., **Seager, S.** 2013, "Constraining Exoplanet Mass from Transmission Spectroscopy", *Science*, 342, 1473-1477.

Zsom, A., de Wit, J., Stamenkovic, V., **Seager, S.** 2013, "Toward the Minimum Inner Edge Distance of the Habitable Zone", *ApJ*, 778, 109-125.

**Seager, S.**, Bains, W., & Hu, R. 2013 “Biosignature Gases in H<sub>2</sub>-Dominated Atmospheres on Rocky Exoplanets”, *ApJ*, 777, 95-113.

**Seager, S.**, Bains, W., & Hu, R. 2013, “A Biomass-Based Model to Estimate the Plausibility of Exoplanet Biosignature Gases”, *ApJ*, 775, 104-127.

**Seager, S.** 2013, “Exoplanet Habitability”, *Science*, 340, 577-581.

**Seager, S.**, Schrenk, M., & Bains, W. 2012, “An Astrophysical View of Earth-Based Metabolic Biosignature Gases”, *Astrobiology*, 12, 61-82.

\*Demory, B.-O., & **Seager, S.** 2011, “Lack of Inflated Radii for Kepler Giant Planet Candidates Receiving Modest Stellar Irradiation”, *ApJS*, 197, 12-16.

\*Demory, B.-O., Gillon, M., Deming, D., Valencia, D., **Seager, S.**, Benneke, B., Lovis, C., Cubillos, P., Harrington, J., Stevenson, K. B., and 4 coauthors 2011, “Detection of a Transit of the Super-Earth 55 Cancri e with Warm Spitzer”, *A&A*, 533, 114.

**Seager, S.**, & Deming, D. 2010, “Exoplanet Atmospheres”, *Ann. Rev. Astron. and Astrophys.*, 48, 631-672.

\*Rogers, L. A., & **Seager, S.** 2010, “Three Possible Origins for the Gas Layer on GJ 1214b”, *ApJ*, 716, 1208-1216.

\*Rogers, L. A., & **Seager, S.** 2010, “A Framework for Quantifying the Degeneracies of Exoplanet Interior Compositions”, *ApJ*, 712, 974-991.

\*Madhusudhan, N., & **Seager, S.** 2009, “A Temperature and Abundance Retrieval Method for Exoplanet Atmospheres”, *ApJ*, 707, 24-39.

**Seager, S.**, & Deming, D. “On the Method to Infer an Atmosphere on a Tidally-Locked Super Earth Exoplanet and Upper limits to GJ 876d”, *ApJ*, 703, 1884-1889.

\*Miller-Ricci, E., **Seager, S.**, & Sasselov, D. 2009, “The Atmospheric Signatures of Super-Earths: How to Distinguish Between Hydrogen-Rich and Hydrogen-Poor Atmospheres”, *ApJ*, 690, 1056-1067.

**Seager, S.**, Kuchner, M., Hier-Majumder, C. A., & Militzer, 2007, “Mass-Radius Relationships for Solid Exoplanets”, *ApJ*, 669, 1279-1297.

**Seager, S.**, Richardson, L. J., Hansen, B. M. S., Menou, K, Cho, J., & Deming, D. 2005, “On the Day Side Thermal Emission of Hot Jupiters”, *ApJ*, 632, 1122-1131.

Deming, D., **Seager, S.**, Richardson, L. J., & Harrington, J. 2005, “Detection of Infrared Radiation from an Extrasolar Planet”, *Nature*, 434, 740-743.

**Seager, S.**, & Mallen-Ornelas, G. 2003, “On the Unique Solution of Planet and Star Parameters from an Extrasolar Planet Transit Light Curve”, *ApJ*, 585, 1038-1055.

\*Ford, E. B., **Seager, S.**, & Turner, E. L. 2001, “Characterization of Extrasolar Terrestrial Planets from Diurnal Photometric Variability”, *Nature*, 412, 885-887.

**Seager, S.**, Whitney, B. A., & Sasselov, D. D. 2000, “Light Curves and Polarization of the Close-in Extrasolar Giant Planets”, *ApJ*, 540, 504-520.

**Seager, S.**, & Sasselov, D. D. 2000, "Theoretical Transmission Spectra During an Extrasolar Giant Planet Transit", ApJ, 537, 916-921.

**Seager, S.**, Sasselov, D. D., & Scott, D. 2000, "How Exactly Did the Universe Become Neutral?", ApJS, 128, 407-430.

**Seager, S.**, Sasselov, D. D., & Scott, D. 1999, "A New Calculation of the Recombination Epoch", 1999, ApJ, 523, L1-5.

**Seager, S.**, & Sasselov, D. D. 1998, "Extrasolar Giant Planets Under Strong Stellar Irradiation", ApJ, 502, L157-161.

---

## **Books**

---

**Seager, S.** 2010, "Exoplanet Atmospheres: Physical Processes", Princeton University Press, ISBN: 978-1-4008-3530-0

**Seager, S.** (editor) 2010, "Exoplanets", University of Arizona Press, ISBN: 978-0816529452

---

## **Invited Autobiographical Essay, "Astrobiology Pioneers"**

---

**Seager, S.** 2012, "Written in the Stars", Astrobiology, 12, 83-88.