

## CURRICULUM VITÆ

### Sarbani Basu, Ph.D.

William K. Lanman Jr. Professor and Chair, Department of Astronomy, Yale University  
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### **Education and Professional Preparation:**

1986 B.Sc. in Physics, Women's Christian College, Chennai, India  
1988 M.Sc. in Physics, University of Poona, Pune, India  
1993 Ph.D. in Physics, Tata Institute of Fundamental Research, Mumbai, India  
1993–1994 Post-Doctoral Researcher, Queen Mary & Westfield College, London, U.K.  
1994–1997 Post-Doctoral Researcher, Theoretical Astrophysics Center, Univ. of Aarhus, Denmark  
1997–1999 Member, Institute for Advance Study, Princeton, NJ, USA

### **Academic positions held:**

2021–present William K. Lanman Jr. Professor of Astronomy  
2016–present Chair, Department of Astronomy, Yale University  
2014–2016 Member, Physical Sciences and Engineering Tenure and Advisory Committee, Yale University  
2011–2016 Director of Graduate Admissions, Department of Astronomy, Yale University  
2009–2010 Member, Social Sciences Tenure Committee, Yale University  
2005–present Professor, Department of Astronomy, Yale University  
2004–2005 Associate Professor, Department of Astronomy, Yale University  
2002–2007 Director of Graduate Studies, Department of Astronomy, Yale University  
2001–2002 Director of Graduate Admissions, Department of Astronomy, Yale University  
2000–2004 Assistant Professor, Department of Astronomy, Yale University

### **Honors and Awards:**

- 2020: Fellow of the American Astronomical Society
- 2018: The George Ellery Hale Prize of the Solar Physics Division of the American Astronomical Society
- 2015: Fellow of the American Association for the Advancement of Science
- 2002: Hellman Family Faculty Fellowship, Yale University
- 1996: The M.K. Vainu Bappu Gold Medal of the Astronomical Society of India.

**Publications:** >280 peer-reviewed publications (access at [http://bit.ly/Basu\\_papers\\_ADS](http://bit.ly/Basu_papers_ADS))  
1 full-length book, <http://press.princeton.edu/titles/11170.html>  
>23000 citations as per the Astrophysics Data System (ADS), H index = 82  
>30000 citations as per Google Scholar, H index = 94

**Research Interests:** Solar and stellar astrophysics; solar structure, dynamics and variability; solar and stellar activity cycles; using solar structure to study fundamental properties of matter; asteroseismic studies of stellar evolution; using stellar properties to probe Galactic structure.

## **Managerial/ supervisory/ advisory positions and roles:**

2020–present	<u>Member</u> , Selection Committee of the Dannie Heineman Prize of the AAS
2019–2021	<u>Chair</u> , Panel on the Sun Stars and Stellar Populations, ASTRO2020 decadal survey
2018–2021	<u>Vice Chair</u> , Board of Directors, Association of Universities for Research in Astronomy (AURA). AURA manages US astronomical facilities such as the Space Telescope Science Institute, the National Solar Observatory, the National Optical Astronomy Observatories, and the Gemini Observatory. It manages more than \$500M in construction projects for NSF and NASA for the construction of the Daniel K. Inouye Solar Telescope (DKIST) and the Vera Rubin Observatory.
2017–present	<u>Member</u> , Advisory Board, <i>Solar Physics</i>
2017–2018	<u>Chair</u> , Science and Engineering Chairs’ Council (SECC) at Yale. The SECC Chair interacts with Chairs of science and engineering departments at Yale (including Mathematics, Statistics, Psychology and Anthropology) and liaises with Yale administration to relay concerns and solve issues brought forward by the other chairs.
2016–present	<u>Chair</u> , Department of Astronomy, Yale University
2016–2016	<u>Chair</u> , Mikulsky Archive for Space Telescopes (MAST) Users’ Group (MUG). MUG ensures that the data archives housed at MAST are well maintained, easily accessible, and serves users’ needs.
2015–present	<u>Member</u> , Board of the TESS Asteroseismic Science Consortium (TASC). TASC is an international consortium of about 150 scientists that organizes the asteroseismic analysis of data collected by NASA’s TESS mission. The Board sets the policies of the consortium.
2014–2018	<u>Member</u> , Board of Directors, AURA
2014–present	<u>Member Representative for Yale University to AURA</u>
2014	<u>Member</u> , Visiting Committee to evaluate physics and laboratory astrophysics done with laser facilities that are funded by the French Commissariat à l’Energie Atomique (CEA).
2014	<u>Member</u> , Evaluation Committee charged with evaluating the performance of the Director of the Space Telescope Science Institute.
2013–2015	<u>Member</u> , Mikulsky Archive for Space Telescopes (MAST) Users’ Group (MUG)
2012–2013	<u>Member</u> , Committee of Visitors, National Solar Observatory. The committee was charged with determining the state of the observatory, operations and staff concerns.
2011	<u>Member</u> , Evaluation Committee charged with evaluating the performance of National Solar Observatory’s leadership.
2009–present	<u>Member</u> , Steering Committee, <i>Kepler</i> Asteroseismic Science Consortium (KASC). KASC is an international consortium of about 200 scientists engaged in asteroseismic analysis of data collected by NASA’s <i>Kepler</i> mission. The steering committee set policy for collaborations and data usage.
2008	<u>Committee of Visitors</u> , ATM division of the GEO directorate of the National Science Foundation.
2006–2009	<u>Member</u> MOWG (Management and Operations Working Group) of NASA’s “Living With a Star” program.
2005–2011	<u>Member</u> , Users’ Committee, National Solar Observatory.
2005–2008	<u>Member</u> , Steering Committee, Summer School of the Solar Physics Division of the American Astronomical Society.
2004–2004	<u>Chair</u> , Nominating Committee, Solar Physics Division.
2003–2010	<u>Member</u> , Scientific Advisory Committee of the Global Oscillation Network Group (GONG). GONG is a network of solar observatories funded by NSF used to measure solar oscillations.

### **Service at Yale:<sup>1</sup>**

2001–2002	Director of Graduate Admissions, Department of Astronomy
2002–2007	Director of Graduate Studies, Department of Astronomy
2004–2004	Member, Committee to select Prize Teaching Fellows
2005–2006	Member, Yale College Steering Committee
2005–2006	Member, <i>ad hoc</i> Committee on International Student Affairs
2005–2006	Member, Executive Committee, Yale Graduate School of Arts and Sciences
2009–2010	Member, Social Sciences Tenure Committee
2009–2011	Member, Yale College’s Sexual Harassment Grievance Board
2009–present	Member, University Advisory Committee of the Yale-New Haven Teachers’ Institute
2010–2012	Member, Graduate School Committee on Regulations and Discipline
2012–2016	Director of Graduate Admissions, Department of Astronomy
2012–2013	Member, Information & Technology Services Research Technologies Committee
2013–2014	Member, Steering Committee, Yale College
2014–2016	Member, Physical Sciences Tenure Committee
2014–present	Member Representative for Yale to AURA
2016–present	Chair, Department of Astronomy

### **Professional Memberships:**

1. American Association for the Advancement of Science
2. American Astronomical Society
3. American Geophysical Union
4. Astronomical Society of India

### **Peer-review activities:**

1. Referee for Astrophysical Journal, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, Reviews of Modern Physics, Solar Physics, Nature, Physical Review Letters, Europhysics Letters
2. Proposal reviewer for NASA and NSF
3. Reviewer for the European Research Council (ERC)
4. Proposal reviewer for United Kingdom Particle Physics and Astrophysics Research council’s proposals
5. Reviewer for the Austrian Science Fund
6. Reviewer for Canadian Space Agency
7. Reviewer for German Science Foundation
8. Reviewer for the Belgian Science Foundation
9. Reviewer for the Knut & Alice Wallenberg Foundation, Sweden

### **Mentorship:**

Post-doctoral researchers: Matthew Templeton (2000–2002), Linghuai Li (2002–2004), Anwesh Mazumdar (2005–2007), Chia-Hsien Lin (2006–2007), Sebastien Deheuvels (2010–2012), Jean McKeever (2017–2020), Samaiyah Farid (2020–present)

Research Scientist: LingHuai Li (2004 - 2012)

PhD students: Charles Baldner (Ph.D. 2010), Ning Gai (2011), Joel Tanner (2013), Lisa Esch (2015), John M. Brewer (2016), Earl Bellinger (2018), Lucas Viani (2020), Joel Ong (expected 2022)

Other Graduate-student research projects: Hugh Crawl (2002), Brooke Simmons (2002), Jeffry van Duyne (2003), R. Katherine Vieira (2003), Andrew Cantrell (2004), Lisa Ferrara (2007), Joel Tanner (2007), Ana Bonaca (2011), John M. Brewer (2011), Joseph R. Schmitt (2014), Lucas Viani (2015), Joel Ong (2016),

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<sup>1</sup> I have been involved in 5 faculty searches at Yale. Dept. of Astronomy being a small department all faculty members are a part of the search committee.

Christopher Lindsay (2021)

Post Baccalaureate research: Courtney Watson (2019 – 2012)

Undergraduate Senior theses: Daniel Isquith (2002), Braxton Collier (2005), Ronli Diakow (2006), Jeffrey Z. Thompson (2006), Archer Kinnane (2018). Katherine Melbourne (2019)

Summer Undergraduate research: Peter Coxeter (2000), Catherine Finlay IZard (2003), Anna Mandel (2004), Evan Blasy (2017), Daniel Saunders (2020–)

**Teaching and other pedagogical activities:**

Yale (2000 – present; each class taught multiple times)

Stars and Their Evolution	Calculus-based undergraduate introductory class.
Stellar Astrophysics	Graduate/Advanced undergraduate level class
The Physics of Astrophysics	Graduate level class; mandatory for all graduate students
Radiative Processes	Graduate/Advanced undergraduate level class
Solar Physics	Graduate/Advanced undergraduate class

Aarhus University (1994-1997):

Stellar Structure and Evolution	Substitute lecturer for graduate level class (10 lectures over 2 years). Supervised problem-solving sessions (3 semesters).
Stellar oscillations	Substitute lecturer (2 lectures). Supervised problem-solving sessions (3 semesters)

Queen Mary and Westfield College (1993-1994)

Mathematics for Engineers	Conduct problem-solving classed (2 semesters)
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Miscellaneous Lectureships

2012	Lecturer, Winter School on Astronomical Surveys, Tata Institute of Fundamental Research, Mumbai, India
2012	Lecturer, Summer School on Solar Physics, Boston University
2010	Lecturer, XXII Canary Island Winter School “AsteroSeismology”, La Laguna, Tenerife, Spain
2006	Lecturer, Kodaikanal School on Solar Physics, Kodaikanal Solar Observatory, India
2006	Lecturer, Program for Talented Youth, Yale University
2000	Lecturer on Helioseismology at the Theoretical Advanced Study Institute (TASI), Boulder, CO
2000	Lecturer, Program for Talented Youth, Yale University

**Public Outreach and Engagement:**

1. Multiple public lectures, list at end of this document
2. Leader, Yale-New Haven Teachers’ Institute Program on “Solar Variability” in summer 2005. The program counted as continuing education and training for Public School Teachers
3. Leader, Yale-New Haven Teachers’ Institute Program on “Astronomy, Mathematics and Physics of the Solar System” in summer 2007. The program counted as continuing education and training for Public School Teachers
4. In 2012 along with the Peabody Museum organized a summer program on the Sun for teachers who teach grades 3-7 in New Haven Public Schools
5. In 2013 along with the Peabody Museum organized a summer program on the Sun for teachers who teach grades 8-10 in New Haven Public Schools

**Funding history:** A successful record of obtaining external funding, *including an NSF CAREER Award.*

1. 2000–2004: PI NASA grant NAG5-10912 (\$ 157,358), “Probing Cycle-Related Changes in the Outer Layers of the Ring-Diagram Analysis.”
2. 2002–2005: PI NSF Grant, ATM 026130 (\$ 347,314), “Solar Variability: Modeling and Helioseismic Studies.”
3. 2006–2012: Co-I, NASA contract, “Helioseismic and Magnetic Imager for Solar Dynamics Observatory,” (\$

357,490 for Co-I).

4. 2004–2009: P.I., NSF Career grant (\$597,442), “CAREER: Solar Variability in the Classroom and in Research.”
5. 2006–2009: P.I., NASA grant NNG06GD13G (\$ 193,931) “Probing the structure and dynamics of the outer layers of the Sun”,
6. 2008–2011: P.I., NSF grant ATM 0737770 (\$ 399,383) “Helioseismology and Solar Magnetic Fields: Studying the forward problem”
7. 2009–2012: P.I., NASA ATFP grant NNX09AJ53G (\$ 369,534) “Modeling convection in stars: from 3D simulations to 1D approximations”
8. 2010–2013: P.I., NASA grant NNX10AE60G (\$ 373,404) “The structure and dynamics of the solar interior during the minimum of cycle 24”
9. 2011–2014: P.I. NASA Education and Public Outreach grant NNX11AH34G (\$310, 820) “Solar Cycle Investigations: NASA Science Exploration for Middle School Students and Teachers”
10. 2011–2014: P.I. NSF grant AST–1105930 (\$ 345,486) “Journey to the Centre of Stars: Testing Stellar Evolution with Asteroseismology”
11. 2013–2016: P.I. NASA grant NNX13AE70G (\$ 346,017) “Charting the properties of stars in the Kepler field to study the Galaxy”
12. 2015–2018: P.I. NSF grant AST–1514676 (\$ 433,565) “Decreasing Systematic Errors in Estimates of Stellar Ages”
13. 2016–2019: P.I. NASA grant NNX16AI096 (\$372,191) “The Giants in The Kepler Fields”
14. 2016–2017: US P.I. for NASA K2 guest observer grant NNS16AE65G (\$18,000) “Asteroseismology of solar-type stars with K2 (K2G02)”
15. 2017–2018: US P.I. for NASA K2 guest observer grant NNX17AL49G (\$40,000) “Asteroseismology of solar-type stars with K2 (K2G04)”
16. 2018–2019: US P.I. for NASA K2 guest observer grant 80NSSC18K0363 (\$35,000) “Asteroseismology of solar-type stars with K2 (K2G05)”
17. 2018–2021: P.I. NASA TESS Guest Investigation grant (\$70,000) “Investigating the evolution of Helium”

#### **Scientific Organizing Committees of Meetings:**

1. Member, Scientific Organizing Committee, SOHO 6/GONG 98 Workshop, Boston, June 1998
2. Member, Scientific Organizing Committee, SOHO 12/GONG 02 Workshop, Big Bear, October 2002
3. Member, Scientific Organizing Committee, GONG2006/SOHO 18/Helas 1 meeting “Beyond the Spherical Sun,” Sheffield, U.K., August 2006
4. Member, Scientific Organizing Committee, SOHO 17 meeting “10 Years of SOHO and Beyond”, Sicily, May 2006.
5. Chair, Scientific and Local Organizing Committees, GONG 2004 –SOHO 14 meeting, New Haven, CT, USA, July 2004
6. Member, Scientific Organizing Committee, 2010 Sagan Summer Workshop
7. Member, Scientific Organizing Committee, *Kepler* Asteroseismic Science Consortium meetings 2011 (Boulder, USA), 2012 (Hungary), 2013 (Sydney, Australia)
8. Member, Scientific Organizing Committee, “Fifty Years of Seismology of the Sun and Stars,” Tucson, AZ, May 2013
9. Member, Scientific Organizing Committee, “New advances in stellar physics: from microscopic to macroscopic processes”, Roscoff, France, May 2013
10. Member, Scientific Organizing Committee, 19<sup>th</sup> Cambridge Cool Stars Meeting, Uppsala, Sweden, 2016
11. Member, Scientific Organizing Committee, TESS Asteroseismic Science Consortium meetings 2016 (Terceira, Portugal), 2017 (Birmingham, UK), 2020 (Leuven, Belgium)
12. Member, Scientific Organizing Committee, 20<sup>th</sup> Cambridge Cool Stars Meeting, Boston, 2018

#### **Invited Colloquia:**

1. *Spatial and Temporal Evolution of Gas and Heavy Elements in the Galaxy*, Indian Institute of Science,

- Bangalore, India, January, 1993
2. *Multiplicity Corrected Initial Mass Function of the Solar Neighbourhood*, Indian Institute for Astrophysics, Bangalore, India, January, 1993
  3. *Spatial and temporal evolution of gas and heavy elements in the Galaxy*, Queen Mary and Westfield College, London, U.K., September 1993
  4. *The Seismic Sun*, Institute for Advanced Study, Princeton, NJ, January 1997
  5. *The Seismic Sun*. Rutgers University, New Brunswick NJ, November 1997
  6. *The Seismic Sun*, Yale University, New Haven CT, January 1999
  7. *Testing Stellar Equations of State Using Helioseismology*, Tata Institute of Fundamental Research, Mumbai India, January 1999
  8. *Peering into the Sun*, Carnegie Institute of Washington, Washington DC, October 1999
  9. *Peering into the Sun*, Massachusetts Institute of Technology, Boston MA, November 1999
  10. *Peering into the Sun*, Ohio State University, Columbus OH, March 2000
  11. *Probing the heart of the Sun*, Wesleyan University, Middletown CT, November 2000
  12. *Temporal variations of solar structure and dynamics*, Tata Institute of Fundamental Research, Mumbai India, March 2001
  13. *Helioseismology and the Solar Neutrino Problem*, Yale Center for Astronomy and Astrophysics, February 2002
  14. *Solar Cycle Related Changes in the Sun*, University of Arizona, April 2002
  15. *What has Helioseismology Revealed about the Solar Cycle?* Tata Institute of Fundamental Research, Mumbai India, December 2002
  16. *Peering into the Sun*, University of Southern California, Los Angeles, February 2003
  17. *Helioseismology and Solar Variability*, Carnegie Institute of Washington, Washington DC, May 2003
  18. *What have we learned about the solar cycle using helioseismology?* Rutgers University, New Brunswick NJ, October 2003
  19. *Some recent results in helio- and asteroseismology*, University of Rochester, Rochester, N.Y., April 2005
  20. *Some recent results in helio- and asteroseismology*, University of Massachusetts, Amherst, M.A., May 2005
  21. *Seismology of the Sun and Stars*, Dartmouth College, Hanover N.H., March 2006
  22. *Trouble in Paradise: A tale of solar abundances*, Yale University, New Haven, CT, September 2006
  23. *Journey to the Centre of the Sun*, Columbia University, New York, NY, October 2006
  24. *Trouble in paradise: A tale of solar abundances*, California Institute of Technology, Pasadena, CA, November 2006
  25. *So, what's the matter with solar abundances?* Institute for Advanced Study, Princeton, N.J., March 2008
  26. *Peering into the heart of the Sun: What have we learned during solar cycle 23?* Beijing Normal University, Beijing, China, October 2008
  27. *The problem with solar abundances: Do we have the solution yet?* National Astronomical Observatories Headquarters, Beijing, China, October 2008
  28. *What have we learned during solar cycle 23?* Yunnan Observatory, Kunming, China, October 2008
  29. *Journeying to the centre of the Sun*, University of Montreal, Montreal, Canada, November 2008
  30. *The Seismic Study of the Sun and Other Stars*, Max Planck Institute for Solar System Physics, Germany, May 2009
  31. *Interpreting Helio- and Asteroseismic Data*, University of Birmingham, Birmingham, U.K., June 2009
  32. *The Journey to the Centre of Stars with Kepler*, Wesleyan University, Middletown, CT, November 2011
  33. *A Journey to the Centre of Stars*, 'Science Today' Lecture, State University of New York, Oswego, NY, February 2012
  34. *What the Sun has taught us about basic properties of matter?* Plasma Physics Laboratory, Princeton University, Princeton, NJ March 2012
  35. *How Asteroseismology is Challenging Stellar Astrophysics?* Institute for Advanced Study, Princeton, NJ, December 2013
  36. *Oh, that Wretched Surface Term!* Max-Planck Institute for Solar System Research, Göttingen, Germany, March 2014
  37. *What We Saw in the Deep Solar Minimum and Beyond?* Max-Planck Institute for Solar System Research, Göttingen, Germany, March 2014

38. *Asteroseismology: Methods and Issues*, Beijing Normal University, Beijing, China, September 2014
39. *Asteroseismology: Some Results*, Beijing Normal University, Beijing, China, September 2014
40. *Solar Cycle Related Changes in the Sun*, Beijing Normal University, Beijing, China, September 2014
41. *Journeying to the center of stars*, New York University, May 2015
42. *Investigating the heart of a star*, Indian Institute for Astrophysics, Bangalore, India, December 2015
43. *How to peek inside a star*, Florida State University, January 2016
44. *How to Peek Inside a Star*, Boston University, February 2017
45. *How to peer into the hearts of stars*, AURA Member Representatives Meeting, Tucson, AZ, May 2018
46. *Peering into Stars*, Yale University, September, 2018
47. *The changing Sun*, MIT, March 2019
48. *The deep-seated roots of solar variability*, University of Leicester, UK, June 2019
49. *Learning physics through Astronomy: The Sun and stars as laboratories*, Weizmann Institute, Rehovot, Israel, March 2020 [cancelled due to COVID-19]
50. *The hidden lives of stars*, Weizmann Institute, Rehovot, Israel, March 2020 [cancelled due to COVID-19]
51. *The hidden lives of stars*, Hebrew University, Jerusalem, Israel, March 2020, [cancelled due to COVID-19]
52. *Learning physics through Astronomy: The Sun and stars as laboratories*, TIFR Mumbai, India, October 2020 (virtual)
53. *The Sun in Time*, Leibniz Inst. for Astrophysics, Potsdam, Germany, November 2020 (virtual)
54. *The Sun in Time and Other Mysteries*, Centre for Computation Astrophysics, January 2021 (virtual)
55. *Mysteries of the Sun*, Pabna University, Bangladesh, January 2021 (virtual)

#### **Invited Talks in Conferences:**

1. *Determining Solar Structure from Oscillation Frequencies*, Joint Discussion Group 3, XXII IAU General Assembly Meeting, The Hague, Netherlands, August 1994.
2. *The Seismic Sun*, IAU Symposium 181: Sounding Solar and Stellar Interiors, Nice, France, October 1996.
3. *Helioseismic Inversions: massive data sets and the determination of Solar Structure*, "Massive Data Sets" session, Joint Mathematics Meetings of the American Mathematical Society, San Diego, January 1997
4. *Inverse Problems in Helioseismology*, "Astrophysics & Algorithms: A DIMACS Workshop on Massive Astronomical Data Sets", Princeton, May 1997
5. *The Seismic Sun* (award lecture), 19th meeting of the Astronomical Society of India, Bangalore, February 1999
6. *Solar Differential Rotation*, "Astrophysical Turbulence," Santa Barbara, May 2000
7. *Solar Structure Inversions: Some Recent Results*, "Xith IRIS and LOWL/ECHO Workshop: Prospects for Ground Based Helioseismology at Low Degree," Boulder CO, June 2000
8. *Helioseismically Deduced Solar Cycle Related Changes in the Sun*, "1st Joint Scientific Assembly of IAGA-IASPEI", Hanoi, Vietnam, August 2001
9. *What does helioseismology tell us about structural changes with the solar cycle?* SOHO11 symposium, "From Solar Min to Max: Half a solar cycle with SOHO," Davos, Switzerland, March 2002.
10. *Changes in the Sun: 1995 to 2001*, Spring Meeting of the American Geophysical Union, Washington DC, May-June 2002
11. *Stellar Inversions*, "Asteroseismology across the HR diagram." Conference in Porto, Portugal July 2002
12. *Helioseismic estimates of the latitudinal dependence of solar structure and dynamics*, "3D stellar Evolution." Workshop held at the Dept. of Applied Science, UC Davis, Livermore, CA, July 2002.
13. *Effect of Asymmetry on Ring-Diagram mode Parameters*, "Local Helioseismology Comparison Workshop," National Solar Observatory, Tucson, AZ, March 2003.
14. *What does the Sun Teach us about Properties of Matter* (Parker Lecture), Solar Physics Division Meeting, Laurel MD, June 2003
15. *Rings diagrams: strengths and uncertainties*, "Local Helioseismology Comparison Workshop," JILA, University of Colorado, Boulder CO, July 2003
16. *Helioseismic evidence of mixing in the Sun*, "Chemical Abundances and Mixing in Stars in the Milky Way and its Satellites," ESO-Arcetri Workshop, Italy, September 2004
17. *Studying Stellar Evolution with (Helio)Seismology* (Plenary Talk), American Astronomical Society Meeting 207, Washington. D.C., January 2006.

18. *Interpreting solar frequencies: Methods and techniques*, "SOHO 17: 10 Years of SOHO and Beyond," Giardini Naxos, Italy, May 2006.
19. *What has helioseismology taught us about the Sun?* "Cool Stars 14," Pasadena, CA, November 2006
20. *Are Inputs to Standard Solar Models Correct?* American Astronomical Society Meeting 210, Honolulu, HI, May 2007
21. *Helioseismic evidence of changes inside the Sun*, Forum on Solar Influence on Climate, New Haven, CT, March 2008
22. *The solar metallicity problem: Do we have the solution?* "GONG 2008/SOHO XXI: Solar-stellar dynamos as revealed by helio- and asteroseismology," Boulder, CO, August 2008
23. *The problem with solar abundances: Do we have the solution yet?* Workshop on Variable Stars, Beijing, China, November 2008
24. *Helioseismology as a diagnostic of the solar interior*, "HELAS: Synergies between solar and stellar modelling," Rome, Italy, June 2009
25. *Changes in solar structure and rotation during solar cycle 23*, Joint Discussion 11: "New Advances in Helio- and Astero-Seismology," IAU General Assembly, Rio de Janeiro, Brazil, August 2009
26. *Oscillations in Clusters: Report on KASC Working Group # 2*, 3rd Kepler Asteroseismology Workshop, "Kepler Asteroseismology in Action", Aarhus, Denmark, June 2010
27. *GONG 2010 – SOHO 24: A summary of the conference*, GONG 2010 – SOHO 24: A new era of seismology of the Sun and solar-like stars, Aix-en-Provence, France, July 2010
28. *The issue of solar abundances*, "The power of helio- and asteroseismology", Aarhus, Denmark, October 2010
29. *Asteroseismology*, Princeton Center for Theoretical Science program 'Seismology of the Earth and Stars', May 2011
30. *The structure of the solar tachocline*, Princeton Center for Theoretical Science program 'Differential Rotation in Stars', May 2011
31. *Why we need SONG*, 4th SONG workshop, College of Charleston, Charleston, SC, September 2011
32. *Helioseismology and the early solar luminosity*, Workshop "The Faint Early Sun: Problem, Paradox or Distraction?" STScI, Baltimore, MD, April 2012.
33. *Confronting stellar structure theory with asteroseismic data*, 9th HEDLA conference, Florida State University, Tallahassee, FL, May 2012
34. *Ensemble Asteroseismology: How Kepler is changing stellar astrophysics*, Kepler meeting-in-a-meeting, 220th meeting of the American Astronomical Society, Anchorage, AK, June 2012
35. *Helioseismic Inferences about the Sun's Internal Abundances and Equation of State*, Workshop on Helioseismology held at the International Space Science Institute, Bern, Switzerland, Bern, Switzerland, September 2012
36. *Using Kepler to Constrain Nuclear Reactions*, Nuclear Astrophysics Town Hall meeting, Detroit, October 2012
37. *The peculiar solar cycle, where do we stand?* (Keynote lecture), "Eclipse on the Coral Sea – Cycle 24 ascending", Palm Cove, Queensland, Australia, November 2012
38. *Helio- and Asteroseismology* (keynote address), "Advances in seismology of the Sun and stars," Mumbai, India, December 2015
39. *Some thoughts about analyzing clusters*, "PLATO2.0: Coordination of the Stellar-Properties work packages," University of Porto, Portugal, March 2015
40. *Determining seismic properties with asteroseismic data*, "Space Asteroseismology: the next generation," University of Aarhus, Denmark, June 2015
41. *Seismic inferences of solar and stellar structure*, "The Sun, the stars, and the solar-stellar connection," Kippenhauer Institute, Freiburg, Germany, September 2015
42. *Helioseismic tests of the equation of state*, Focus Meeting 17 of the General Assembly of the International Astronomical Union, Honolulu, August 2015
43. *Using the Sun as a laboratory to test physics*, Conference in honor of Phil Scherrer's 70<sup>th</sup> birthday, Santa Cruz, CA, August 2016
44. *What helioseismology has taught us about opacities and EOS*, Workshop on Astrophysical Opacities, Kalamazoo, MI, August 2017
45. *A helioseismic perspective of solar-cycle related changes in the Sun: Evidence and unsolved issues*, Workshop in honor of Arnab Rai Chaudhuri's 60<sup>th</sup> birthday, Jaipur, India, February 2018



46. *Large-scale flows in the Sun: Characteristics and variations*, IAU Symposium 340, Jaipur, India, 2018
47. *An Amazing Journey to the Center of the Sun* (award lecture), the Triennial Earth-Sun Summit, Leesburg VA, 2018
48. *Amazing Journeys to the Hearts of Stars* (Award Lecture), 232<sup>nd</sup> meeting of the American Astronomical Society, Denver, CO 2018, June 2018
49. *Asteroseismology of solar-like stars with Kepler and K2 (or a celebration of Kepler!)*, “First Light in a new Era of Astrophysics”, the TASC4/Kepler11 conference, Aarhus, Denmark, July 2018
50. *Some Issues in Stellar Modeling*, Division G meeting, XXXth meeting of the IAU General Assembly, Vienna, Austria, August 2018
51. *Uncovering the hidden layers of the Sun*, Workshop in honor of the life and work of Michael J. Thompson, High Altitude Observatory, Boulder CO, September 2019

### **Contributed talks in Conferences:**

1. *The Effect of Stellar Multiplicities on the IMF and Global Star Formation Rates*, “Star Formation, Galaxies and the Interstellar Medium,” Marciana Marina, Elba, Italy, May 1992
2. *Inversion of Combined and Homogeneous Data Sets*, Working Group 9 (Internal Structure and Inversion), 4th SOHO Workshop on Helioseismology, Pacific Grove, California, USA, April 1995.
3. *Helium Abundance in the Solar Envelope*, Working Group 11 (Frequencies of High Degree Solar Oscillations) 4th SOHO Workshop on Helioseismology, Pacific Grove, California, USA, April 1995.
4. *Solar Structure as Revealed by 1 Year LOWL Data*, “Windows on the Sun’s Interior,” India, October 1995
5. *Solar Cycle Variation of Large Scale Flows in the Solar Interior*, “Helioseismic diagnostics of solar activity,” Stanford, July 1999
6. *Studying Asphericity in the Solar Sound Speed*, “SOHO 10/GONG 2000 Workshop: Helio- and Asteroseismology at the dawn of the millennium” Tenerife, Spain, October 2000.
7. *Ring Diagram Analysis of the Characteristics of Solar Oscillation Modes in Active Regions*, “Local-area Helioseismology”, workshop held at Stanford Univ., Palo Alto, CA, April 2001.
8. *Ring Diagram Analysis of the Structure of Solar Active Regions*, “Local-area Helioseismology Comparisons,” workshop held at the National Solar Observatory, Tucson, AZ, February 2004.
9. *Differences between the current solar minimum and those of cycles 23 and 22*, “SOHO 23: Understanding a Peculiar Solar Minimum,” Northeast Harbor, ME, September 2009
10. *Are recent solar heavy element abundances consistent with helioseismology?* GONG 2010 - SOHO 24: A new era of seismology of the Sun and solar-like stars, Aix-en-Provence, France, July 2010
11. *How different was the last solar minimum?* The 61st Fujihara Seminar “Progress in solar/stellar physics with helio- and asteroseismology,” Hakone, Japan, March 2011
12. *Outreach Efforts with my CAREER Grant: Working with K-12 Teachers*, American Geophysical Union Meeting, San Francisco, December 2011
13. *Asteroseismic Modelling of Kepler Stars*, *Kepler Science Meeting*, NASA AMES, December 2011
14. *Comparing the Internal Structure of the Sun during the Cycle 23 and Cycle 24 Minima*, AGU Chapman Conference on Causes and Consequences of the Extended Solar Minimum Between Solar Cycles 23 and 24, Key Largo, Florida, April 2013
15. *Flows in the polar regions of the Sun: Limits of observing from the Ecliptic*, AGU Fall meeting, December 2020 (virtual)

### **Public Lectures:**

1. *Solar Variability and How it Affects Us*, Yale New Haven Teachers’ Institute, New Haven, CT, April 2004
2. *Astronomy and Astrophysics Today*, Timothy Dwight College, Yale University, New Haven CT, February 2005
3. *A journey to the center of the Sun*, Astronomical Society of New Haven, June, 2007
4. *Peering into the heart of the Sun*, Westport Astronomical Society, Westport, CT, April 2008
5. *Of planets and stars: missions to find distant planets*, Astronomical Society of New Haven, August 2009
6. *A Journey to the Centre of the Sun*, Yale Society of Physics Students, New Haven, CT, USA, February 2010
7. *Studying the Sun*, Peabody Fellows Summer Solar Science Program, New haven, CT, August 2011

8. *The Solar Cycle*, talk given at Peabody Museum, Yale for CT grade 5–8 teachers, November 2012
9. *Studying the Sun*, talk given at Peabody Museum, Yale for CT grade 8 teachers, August 2013
10. *Solar and Stellar Astrophysics Today: Questions and Techniques*, Taft School, CT, Jan 2017
11. *Listening to the Stars*, Greenwich Observatory, Greenwich CT, May 2017
12. *Solar Eclipses: The Dread and the Fascination (and the Science)*, University of South Carolina, August 2017
13. *Journey to the center of the Sun*, Stewart Observatory, Tucson. AZ, May 2018
14. *“Hearing” the structure of the Sun*, Westport Astronomical Society, Westport, CT, April 2019