

Sunday, June 5 – *The Science of Time*

Reception 7:00 – 9:00 pm (Courtyard Marriott – Cambridge)

Monday, June 6 – *The History of Time* (all sessions at Northwest Building, Harvard)

Session 1 9:00 – 10:15 (Arnold Rots, Harvard-Smithsonian Center for Astrophysics)

9:00 *Welcome*

9:05 Chris Impey – *Cosmic Time: From the Big Bang to the Eternal Future* (invited)

9:40 William Andrewes – *The Proof of the Pudding* (invited)

Coffee 10:15 – 10:45

Session 2 10:45 – 12:00 (Pavel Gábor, Vatican Observatory)

10:45 Owen Gingerich – *Ephemerides from Babylon to Kepler* (invited)

11:20 Susanne Hoffmann – *Measuring time and the development of coordinate systems in ancient Babylonia and Greece*

11:40 Susan Nemes – *Changing Times in The Nautical Almanac Over 250 Years*

Lunch 12:00 – 1:30 (provided)

Session 3 1:30 – 2:45 (Owen Gingerich, Harvard University)

1:30 Donald Saff – *Bond Time – The Electric Method of Time Recording* (invited)

2:05 Geoff Parsons – *The Development and Use of the Pilkington and Gibbs Heliochronometer and Sol Horometer*

2:25 Sara Schechner – *These Are Not Your Mother's Sundials: Or, Time and Astronomy's Authority*

Coffee 2:45 – 3:15

Session 4 3:15 – 5:15 (P. Kenneth Seidelmann, University of Virginia)

3:15 Dennis McCarthy – *The History of Time* (invited)

3:50 Frank Reed – *Time and Lunars*

4:10 Harlan Stenn – *'When?' It's a basic question that we ask all the...time* (invited)

4:45 *Discussion* (30m)

Dinner (on your own)

Tuesday, June 7 – *Precision Timekeeping*

Session 5 9:00 – 10:15 (Mizuhiko Hosokawa, National Institute of Information and Communication Technology)

9:00 *Announcements*

9:05 Felicitas Arias – *Atomic time scales and their applications in astronomy* (invited)

9:40 Demetrios Matsakis – *Relativistic Time at the US Naval Observatory* (invited)

Coffee 10:15 – 10:45

Session 6 10:45 – 12:00 (Rob Seaman, Lunar and Planetary Laboratory)

10:45 PENDING – *title* (invited)

11:20 Donald Craig – *Time in Television Systems*

11:40 Steve Allen (Michael Douglass) – *From computer time to civil time: IANA tz and IETF tzdist*

Lunch 12:00 – 1:30 (provided)

Session 7 1:30 – 3:00 (Felicitas Arias, Bureau International des Poids et Mesures)

1:30 Judah Levine – *The UT1 and UTC time services provided by NIST* (invited)

2:05 Fritz Riehle – *On a redefinition of the SI second* (invited)

2:40 Tetsuya Ido – *Time scales steered by optical clocks*

Coffee 3:00 – 3:30

Special 8 3:30 – 5:00 (Steve Allen, University of California Observatories / Lick Observatory)

Tutorial on GPS / NTP timekeeping

Meinberg Radio Clocks

Network Time Foundation

(agenda to follow, Seaman, Burnicki, Stenn)

Dinner (on your own)

Wednesday, June 8 – *Time in the Universe*

Session 9 **9:00 – 10:15** (Ludwig Combrinck, Hartebeesthoek Radio Astronomy Observatory)

9:00 *Announcements*

9:05 Nicole Capitaine – *The determination of Earth orientation by VLBI and GNSS: principles and results* (invited)

9:40 Francois Mignard – *Objectives and Status of the Gaia Mission* (invited)

Coffee **10:15 – 10:45**

Session 10 **10:45 – 12:00** (Rob Seaman, Lunar and Planetary Laboratory)

10:45 John Seago – *Mean Solar Time and Its Connection to Universal Time* (invited)

11:20 Richard Easton – *Time Synchronization and the Origins of GPS*

11:40 Frank Reed - *Teaching Time* (tutorial extending into lunch break)

Lunch **12:00 – 1:30** (provided)

Session 11 **1:30 – 3:05** (Catherine Hohenkerk, Her Majesty's Nautical Almanac Office)

1:30 Stephen Malys – *How gravity and continuity in UT1 moved the Greenwich meridian* (invited)

2:05 Ludwig Combrinck – *Aspects of time as it relates to Space Geodesy*

2:25 Josh Grindlay – *DASCH for Days to Decades Time Domain Astronomy*

2:45 Richard Manchester – *Pulsars – Celestial Clocks* (invited)

Coffee **3:05 – 3:35**

Session 12 **3:35 – 4:55** (John Seago, Analytical Graphics Incorporated)

3:35 Paul Gabor – *The Leap Second Debate: Rational Arguments vs. Unspoken Unease*

3:55 Wolfgang Dick – *How to talk popular about the leap second? The experience of the IERS Central Bureau*

4:15 Bob Frankston – *The leap second should not be commingled with the time we use for appointments*

4:35 Brooks Harris – *Common Calendar Timescale*

Banquet **7:00 – 9:00** (Courtyard Marriott – Cambridge)

Thursday, June 9 – *The Future of Time in Science and Society*

Session 13 9:00 – 10:00 (Jonathan McDowell, Harvard-Smithsonian Center for Astrophysics)

9:00 *Announcements*

9:05 Felicitas Arias – *New technologies and the future of time keeping*

9:25 Danny Hillis – *Long term timekeeping and the Clock of the Long Now* (invited)

Coffee 10:00 – 10:30

Session 14 10:30 – 11:45 (Sara Schechner, Harvard University)

10:30 Daniel Wiley – *Time-Critical: Contesting the Measure of the Now*

10:50 Kevin Birth – *Which Time is Relevant? Explorations of Timescale Pluralism* (invited)

11:25 Michelle Bastian – *Liberating Clocks: Rethinking the potential of clock-time for social life*

Lunch 11:45 – 1:00 (provided)

Session 15 1:00 – 1:55 (Catherine Hohenkerk, Her Majesty's Nautical Almanac Office)

1:00 Rob Seaman – *Keeping Time with the Asteroids*

1:20 Adam Frank – *Whose Time Matters: The Temporal Dimensions of Physics, Philosophy and Human Culture* (invited)

Coffee 1:55 – 2:15

2:15 – Roundtable discussion (pending, moderator: Arnold Rots)

3:00 pm – Symposium adjourns

Friday, June 10 – *Bonus Time*

9:30 am – Tour of Harvard Scientific Instrument Collection (about two hours)

Lunch (on your own)

1:00 – 5:00 pm – Possible add-on meeting (pending)