TSES 4014: Aspects of Time.

Time is a universal human experience, but it presents some profound mysteries. In this course we will look at a variety of points of view of the phenomenon.

Schedule

Location: SH 413
Time: MW 5.30-7

Lecturers

The course will be coordinated and largely taught by Peter Watson <watson@physics.carleton.ca>.

There will be guest lectures from experts in other fields

Literature: Dr Adam Barrows <Adam_Barrows@carleton.ca> (on sabbatical)

Psychology: Dr. Craig Leth-Steensen <clethste@connect.carleton.ca>

Biology: Jennifer Ferraro <jenniferferraro31@gmail.com>

Philosophy: Dr. Andrew Brook <andrew_brook@carleton.ca>

Geology: Dr Alan Donaldson <donaldson6427@rogers.com>

Film: Dr. Marc Furstenau <marc.Furstenau@carleton.ca>

TSE: John Buschek john_buschek@carleton.ca

Evaluation

Assignments: 30%

Book review term paper: 30%

Final exam: 30%

Participation: 10% (will include presentation)

Topics

Introduction/How we talk about time. We will examine how the language we use to discuss time reflects our underlying concepts. (PW: 2 lectures, 8/9,10/9)

Chronos and Kairos: Time and Literature. Literature shows an increasing sophistication in our understanding of time. We start with the Greeks and go to the present day (PW for Adam Barrows, 2 lectures 15/9, 17/9)

Stonehenge to Cesium: How we Measure Time. Calendars originated in agricultural communities to guide crop planting, using the sun and moon. Now we rely on the atom for the most accurate measurements: does this allow us to understand time better? (PW 2 lectures: 22/9, 24/9)

Time in Film: As soon as film appeared in the late nineteenth century, it was understood as a uniquely temporal medium. Throughout the history of the cinema, time has been a major theme, providing filmmakers with a wide range of formal and stylistic possibilities to explore as they

have sought to represent the experience of time. We will ask if film is the true "time art." (Marc Furstenau, 2 lectures 29/9,1/10)

Biological clocks: these exist in all organisms, even at the cellular level. How do they work and how are they related to our perception of time (Jennifer Ferraro , 2 lectures: 6/10, 8/10)

How we Perceive Time. Memory and time are intimately linked, and psychologists have a variety of techniques for studying how we perceive time. (Craig Leth-Steensen 1 lecture 15/10 note Thanksgiving)

Time and Philosophy. Some philosophical questions are: What is time? Can the notion be defined? Is time real or is it a perceptual illusion? Given that only the present moment exists, could there be an alternative universe whose 'now' is five minutes before ours? We can change things in all dimensions of space; why with time can we change things only in the future?. (Andrew Brook, 1 lecture: 20/10)

Past and Future. The question of how tomorrow differs from yesterday is trite in terms of the human experience, but it is surprisingly hard to define in physics terms. This will introduce the Second Law of Thermodynamics and Entropy. (PW 2 lectures 27/10, 29/10)

Deep Time. One of the most profound scientific debates of the 19th century was the discussion of our planet's age. Observations by geologists of the time opened our eyes to the immense timescales involved. (Allan Donaldson, 2 lectures 3/11, 5/11)

Sacred and Profane Time. Different religions have different approaches to time. What ideas can we take from them? (John Buschek, 1 lecture 10/11)

How Matter bends Time. The ideas behind Special and General Relativity, formulated by Einstein at the start of the 20th century undermine most of our intuition, so the concept of universal time is no longer valid. This allows us to address the physics issues of time-travel. (PW 4 lectures: 12/11, 17/11,19/11,24/11)

Time and Prediction. Even if actual time travel is impossible, perhaps we can virtually time-travel by predicting the future. It is possible to prove that there are systems which are intrinsically unpredictable, so forecasting must always be imprecise. (PW 1 lectures 26/11)

The Beginning and the End. Most astronomers believe that the universe began in the Big Bang, about 14 billion years ago. What consequences does this have for the start of time? Is it possible that time will end? (PW 2 lectures: 1/12, 3/12)

Summary: We will try to pull together many of the ideas of the course and present our current understanding and the still unanswered questions. Oh, and can we time-travel? (PW 1 lecture 8/12)

Source Material

Books (non-fiction):

**Time Machines (Paul J. Nahin, also with K. S. Thorne)
Time Travel in Einstein's Universe (J. Richard Gott)
In Search of Time: The History, Physics, and Philosophy of Time (Dan Falk)
About Time (Paul Davies)
** Physics of Star Trek (Lawrence Krauss)
** An Experiment with Time (J. W. Dunne)
** The Labyrinth of Time (Michael Lockwood)
** The End of Time (Julian Barbour)
** From eternity to here: the quest for the ultimate theory of time / Sean Carroll. (Table of Contents in library catalogue)
**Time, space, and metaphysics Bede Rundle. (
**Time & the instant: essays in the physics and philosophy of tim. (Ed. Robin Durie)
** Psychology of Time (Ed. Simon Grondin)
Physics of Star Trek (L. Krauss)
The Physics of the Buffyverse J. Ouellette
** The Stuff of Thought : Language as a Window into Human Nature (Steven Pinker)
** Don't Sleep, There are Snakes (Daniel Everett)

Fiction: short stories

All You Zombies.…. (Robert Heinlein)
...and he built a Crooked House (Robert Heinlein)
All Mimsy were the Borogroves (Lewis Padgett)
The Sound of Thunder (Ray Bradbury)
The Garden of Forking Paths, Library of Babel (Jorges Luis Borges)
A Subway Named Mobius (Deutsch)
The Best Time Travel Stories of the 20th Century: Stories by Arthur C. Clarke, Jack Finney, Joe Haldeman, Ursula K. Le Guin

Fiction: novels

**The Time Machine (H. G Wells)
The Forever War (Joe Haldeman)
**Slaughterhouse 5 (Kurt Vonnegut)
**Times Arrow (Matin Amis)
**Einstein's Dreams (Alan Lightman)
The Time Traveller's Wife (Audrey Niffenegger)
Time and Again (Jack Finney)
The End of Eternity (Isaac Asimov)

Plays

**Dangerous Corner, I have Been Here Before, Time and the Conways, An Inspector Calls (J. B Priestley)
**Arcadia, Hapgood (Tom Stoppard)

Journal Articles

***Ford,Roman Scientific American; January 2000, Vol. 282 Issue 1, p46
Stanford Encyclopedia of Philosophy: Time

Movies

Vertigo (Alfred Hitchcock, 1958)

Cleo from 5 to 7 (Agnes Varda, 1960)

La Jetée (Chris Marker, 1962)

Time Bandits (Terry Gilliam, 1981)

12 Monkeys (Terry Gilliam, 1995)

Timecode (Mike Figgis, 2000)

Russian Ark (Alexander Sokurov, 2002)

Sliding Doors

Back to the Future

Run, Lola, Run

Source Code

Primer

The Butterfly Effect

Somewhere in Time (from Time and Again)

Timecop

Kate and Leopold

The Time Machine (several)

A Sound of Thunder (Vaguely related to Bradbury)

Hot-Tub Time Machine

Bill & Ted's Excellent Adventure

The Last Mimzy (Vaguely related to the Padgett story)

TV

Dr Who; (not many, but try “Blink” in the David Tennant series)
Red Dwarf: (esp. Future Echoes, Time Slide, Stasis Leak, Backwards, Dimension Jump)
Star Trek (some)
Buffy the Vampire Slayer (lot of academic critiques written on Buffy as well)