Futures

Physics/Temporal Engineering 404: Retrograde causal time travel

Something to look back on. By Galen T. Pickett
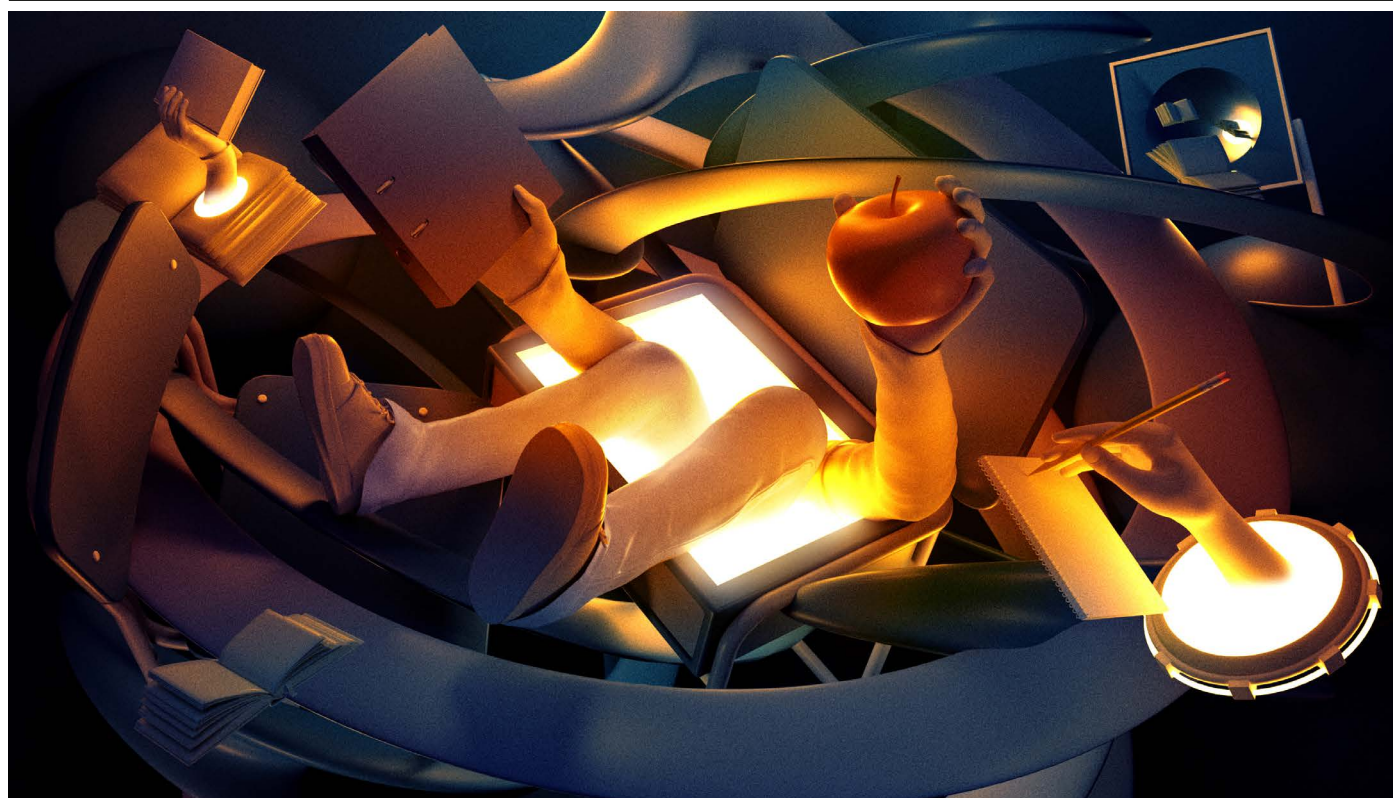
Instructor: Galen T. Pickett
Office: HSTS 204
Office Hours: MWF 10–10:50
Class meets: MWF 11–11:50, HSTS 100

Welcome to Phys/TempE 404: Retrograde causal time travel! This is a required upper-division course in the physics curriculum here at Miskatonic State Institute of Technology. Several of you are also taking this course as an advanced elective in your temporal-engineering degree programmes – welcome to the Department of Physics (and abandon all hope!). My office is up on the second floor of the Hall of Science and Temporal Studies. When my door is open, please feel free to stop by with any issue – course-related, science-related, or about why there are portals embedded in every stairwell leading to the second floor dumping you onto to the first floor.

Seriously, in office hours: *AMA* – ask me anything – but only in office hours and only in my office, *please and thank you in advance!*

In this course we will explore the basics of travel in ordinary space-time into both the 'past' and 'future' light cones. In your elementary coursework you have explored the causal structure of ordinary space-time. Niven's theorem is foundational to the conclusion you should have drawn from that course of study, namely: "Any universe in which arbitrary travel in time is possible will spontaneously destroy any condition under which that mechanism is discovered or employed."

We will explore practical violations of Niven's theorem. To wit, you will be happy to know that *well over half of the students who will attempt to take this course will achieve a passing grade! Eventually! At some point, either in the far future, the far past and, for some of*

you, right now!

As the final project involves creating a working time machine using what you have learnt in this course and the materials in the undergraduate project laboratory, it will be necessary for you to sign the enclosed liability waiver indemnifying the institute (and your humble professor) should your work accidentally (or purposefully) erase your existence, the existence of the institute, or possibly the Universe itself.

The textbook we will have been using this semester will be published just over 100 years from now: *The Shadow Out of Time: Principles of Time-like Closed Orbits in Space-time* (2nd edition) by a giant in our field, 1963 Nobel co-laureate and former member of our department, Professor Howard Lovecraft. The bookstore had several copies of this book two years ago, but if you can get your hands on the

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4th edition, you can certainly use that. Several problems in Chapter 5 will have been numbered differently in the 4th edition compared with the 2nd, so you will need to consult with your classmates if you have a later edition of the book. The 3rd and the 1st editions do not exist (*cf.* Niven's law), so anyone who intends to use these will earn a 10% extra-credit bonus score on every problem set I have assigned last semester.

We have had a total of eight problem sets in this course, each of them due today at 4 p.m. to the dropbox in our campus learning management system, *BlackboardHole*. I know, by now you are used to the unreasonable demands we faculty place on you MSIT students. We ask you to 'sip water from a firehose' on a regular basis, but I am sure you will be able to get the bulk of the work completed and submitted by the deadline. As our school motto has it: *Non intello, ergo non Civis sum*, or, 'If you can't figure that out for yourself, you don't belong here', which rendered into student-vulgar in the graffitied crypts of Randolph Carter Hall yields 'only life can kill you' and 'IHTFP'.

The final exam took place last month, and I have uploaded your final grades to *BlackboardHole* where you will have been able to inspect them. Some of you may have advising questions, such as "how did I fail a course I have not yet taken?" This is, of course, a perfectly natural question.

If you have any (other) questions about your grades, or about how points were assigned, please do hesitate to contact me by e-mail. I get thousands of e-mails every day, from the far future as well as the past: everything from nutcases in the 1700s asking me to look at their world-shaking manuscript, the *Principia Mathematica*, to veiled and not-so veiled threats from immeasurably powerful, cosmic beings who mean us significant harm – or would if I do not immediately partake of their latest investment opportunity. One such being, the bursar of the institute, will certainly be in contact with each of you. Answer *those* e-mails. Please.

The mid-term project involves the quite minor task of sending a message to your great-grandparents instructing them to open an interest-bearing account with the institute. A passing grade on the mid-term project will almost certainly fund your entire MSIT education.

My policy on late or missing assignments is *complete the final project*. No late assignments will be accepted for credit. The one exception to this policy has to do with the final project. Successful completion of your time machine will earn you an arbitrarily long extension. But I doubt you would need it in that case.

Anyone who wishes to drop the course could also, as a part of the mid-term project, send themselves the appropriate message two weeks ago.

I hope you will have been enjoying this semester, I have been looking forward to it, and backward at it, for quite some time to come.

Galen T. Pickett has been a member of the Department of Physics and Astronomy at California State University Long Beach since 1999.

THE STORY BEHIND THE STORY

Galen T. Pickett reveals the inspiration behind *Physics/Temporal Engineering 404: Retrograde causal time travel*.

While in the spring the thoughts of young people may lightly turn to thoughts of love, my thoughts in late summer invariably turn to thoughts of "dear me, where did all the time go … I have to get my syllabi ready!" The end-point of the panicked realization that I was (yet again) out of time was a daydream of a syllabus you see here.