



NATIONAL ENDOWMENT FOR THE

Humanities

DIVISION OF EDUCATION PROGRAMS

Narrative Section of a Successful Proposal

The attached document contains the narrative and selected portions of a previously funded grant application. It is not intended to serve as a model, but to give you a sense of how a successful proposal may be crafted. Every successful proposal is different, and each applicant is urged to prepare a proposal that reflects its unique project and aspirations. Prospective applicants should consult the program guidelines at www.neh.gov/grants/education/enduring-questions for instructions. Applicants are also strongly encouraged to consult with the NEH Division of Education Programs staff well before a grant deadline.

The attachment only contains the grant narrative and selected portions, not the entire funded application. In addition, certain portions may have been redacted to protect the privacy interests of an individual and/or to protect confidential commercial and financial information and/or to protect copyrighted materials.

Project Title: NEH Enduring Questions Course on Time

Institution: University of California, Irvine

Project Director: James Weatherall

Grant Program: Enduring Questions

What won't fly when you try to kill it? What's hard to find but often wasted? What heals all wounds but brings only death?

Time lends itself to riddles. But perhaps the most puzzling riddle is just this: What *is* time? It is central to our conceptions of our lives, our selves, and the world around us—and yet capturing it in words seems impossible. As Augustine put it in the *Confessions*, “If no one asks me, I know what [time] is. If I wish to explain it to him that asks, I do not know.”

The question immediately suggests others. What is change? Is it real or merely illusory? Is the past real, or does it exist only as memories in the present? Is memory reliable? Does the future exist? If so, is everything pre-determined? Does time pass or do we move through time? Is there a process of becoming? What is the nature of temporal experience? How does it relate to physical time and change? Is temporal experience the same for everyone? Is there a common “now”? Does time have a beginning or an end? What accounts for the “arrow” of time? Is time travel possible? And if so, can we re-write the past or change the future?

These questions have been with us for millennia and have spanned world cultures. In ancient Hindu cosmology, for instance, as described in the Rigveda, time extends indefinitely, but the universe goes through an unending process of creation, destruction, and rebirth. In Biblical cosmology, there is a moment at which God creates the cosmos—though there is some controversy regarding whether time extends to “before” creation. The pre-Socratic Greek philosophers Parmenides, Zeno, and Heraclitus all developed sophisticated views on time and change, as did Plato and Aristotle. During the Middle Ages, Christian, Islamic, and Jewish theologians—most notably Augustine—elaborated on and criticized the Platonic and Aristotelian views in the context of Biblical cosmogony. Meanwhile, in China, Zen Buddhism developed a

highly distinctive understanding of time on which time and space are unified into the here-now, and there is no distinction between past, present, and future.

Inquiry into the metaphysics of time took a dramatic shift during the 16th and 17th centuries, with the Scientific Revolution. In particular, Newton argued that his new theories of mechanics and gravitation *required* that time (and space) exist independently of material objects. This Newtonian doctrine brought a new kind of empirical method to bear on what had previously been a conceptual question. But Newton's views were not universally accepted, even by his contemporaries—most notably, Leibniz rejected Newton's claim that absolute time was necessary for Newtonian physics, arguing that one could understand the physics in such a way that time is merely a relation between material events, and not a separate entity unto itself.

Later, at the end of the 18th century, Kant developed yet a third position on time in Newtonian physics, according to which time is transcendently ideal. Roughly speaking, Kant held that temporal relations do not hold between things in themselves; instead, they are features of our experience. Kant inspired several idealist views on time, the most influential of which in Anglophone philosophy was due to the Cambridge philosopher J. M. E. McTaggart. Responses to McTaggart by philosophers such as Russell and Moore initiated the rich field of 20th century analytic philosophy of time.

Almost as soon as this new tradition appeared, however, it was disrupted and ultimately reshaped by profound developments in physics, as Einstein's special and general theories of relativity came to replace the Newtonian picture of space, time, and mechanics. The temporal structure of this new theory marked a major departure from Newtonian physics. Importantly, relativity theory provided a new sense in which temporal facts could be relative—for instance, it was now possible for two people to meet in New York one day, separate, and then return to meet

in New York on another occasion, but disagree about the elapsed time between their meetings. It also provided an important new way of thinking about time, namely, as part of an essentially four-dimensional geometry of “spacetime”. Attempts to understanding time in light of relativity theory continue to generate controversy today—particularly as physicists attempt to combine Einstein’s theory with the other great innovation of 20th century physics, quantum theory.

The intense philosophical focus on the physics and metaphysics of time during the early part of the twentieth century was matched by an equally intense interest in temporal *experience* among modernist novelists in Europe and America. Notable examples of work that dwell on our experience of time and its passage include Joyce’s *Ulysses* (1922), Mann’s *The Magic Mountain* (1924), Fitzgerald’s *The Great Gatsby* (1925), Proust’s *In Search of Lost Time* (1913—1927), and Woolf’s *To the Lighthouse* (1927). In *To the Lighthouse*, for instance, a family travels to their country home twice, separated by a period of ten years; the differences between the two visits is the occasion to reflect on the psychological traumas of temporal passage and change. In *The Magic Mountain*, the main character visits a mountain sanatorium in Switzerland intending to spend three weeks, but stays for seven years. As he gradually becomes accustomed to the rituals of the place, his experience of the passage of time changes.

In later 20th century American fiction, these themes resurface, transformed. In Pynchon’s *The Crying of Lot 49* (1966) and *Gravity’s Rainbow* (1973), characters driven by paranoia strive to construct narratives to regiment and understand their experiences, but to do so they must battle essential disorder and growing entropy. (Entropy in physics, meanwhile, is used to explain how the future differs from the past.) Thus our conventions for time and story-telling are undermined by the sheer uncooperativeness of the world. Nabokov’s *Invitation to a Beheading* (1969) focuses on the role of memory in our experience of time. The novel follows the life of Van

Veen, including his treatise *The Texture of Time*—a sustained argument against the four-dimensionalism of Einsteinian relativity—as one of the book’s main sections.

The course I propose developing and teaching will approach the questions above by drawing on a broad spectrum of fields, including physics, philosophy, fiction, film, and psychology. The course will be organized around two ways of parsing the original question. The first is: how is time represented in our physical theories, from Aristotle to Einstein? The second way of parsing the question is, what is our subjective experience of time and how does it relate to narrative and memory? To gain a satisfying understanding of time, one needs to reckon with both of these questions. And historically they have been closely linked. But from the standpoint of contemporary physics, there is an important tension between them. It feels to us as though time flows, sometimes quickly and sometimes more slowly; we believe that we can affect the future but not the past, and conversely, that we can remember the past but not the future; and we have a conception of a common “now” shared among the people we interact with. Yet it is difficult to find a basis for any of these features of our experience in physics.

The course will be a ten week seminar for undergraduates in the campus-wide honors program at UC Irvine, which includes students from all majors. It will meet twice a week for 80 minutes. The required reading each week will be (roughly) 50-75 pages of philosophical reading or 150-200 pages of fiction, scaled for difficulty. This load is intensive relative to the norm at UCI, but it is appropriate for an upper level honors course. Students will write two 4-5 page essays and participate weekly in an online discussion board where they will express brief reactions to the reading. The course will be offered as part of a new curricular initiative to help honors students develop the research skills necessary to write their senior theses.

I anticipate the basic structure of the course to be as follows. To initiate our inquiry and set the tone, we will begin by watching *Groundhog Day* (1993), in which the events of a single day repeat indefinitely. This will be paired with selections from pre-Socratic, early Taoist, and Zen Buddhist writings on time. We will then read excerpts from Plato's *Timaeus*, Aristotle's *Physics*, and Augustine's *Confessions*. These will focus attention on three views that will occupy us during the course: *absolutism* about time, i.e., the view that time has an intrinsic reality, *relationism* about time, i.e., the view that time is reducible to relations between material objects, and *idealism* about time, i.e., the view that time is a manifestation of our minds. Next we will turn to time as represented in Newtonian physics. We will read Newton's *Scholium on Time and Space*, excerpts from the Clarke-Leibniz correspondence, and excerpts from Kant's *Critique of Pure Reason*. In class I will present a modern geometric perspective on the structure of space and time in Newtonian gravitation. This will set the stage for the next segment of the course, where we will study the basic geometrical structure of relativity theory as it influenced 20th century philosophy of time. Readings will be taken from Einstein, Godel, McTaggart, Moore, Putnam, and Reichenbach. We will also watch the film *Back to the Future* (1985).

This investigation into the physics and metaphysics of time will take roughly half the quarter. In the next half, we will turn to fiction, film, and psychology to explore our temporal experience and contrast it with time as it is represented in physics. We will begin by reading excerpts from *The Magic Mountain* and watching the film *Inception* (2010), which deals with the perception of time in dreams. Next we will read *To the Lighthouse*, followed by *The Crying of Lot 49*. In the final three weeks of the course, we will read *Ada, or Ardor*. These last two novels are especially important because they explicitly engage with the physics of time. We will also watch the film *Memento* (2000), which, like *Ada, or Ardor*, investigates how memory affects our

perception of time and self. Throughout this half of the course, we will read short passages on the psychology of temporal perception from psychologist Ernst Poeppel's *Mindworks*. We will conclude with recent work by Callender and Ismael that engages with both our main themes.

Courses on philosophy of time are a staple of many philosophy curricula. Why should NEH resources be devoted to developing a new one? For one, the proposed course will draw on more diverse philosophical sources than a standard course. In addition to 20th century Anglophone metaphysics, we will engage in depth with traditional Chinese philosophy, with Abrahamic theology, and with Ancient Greek philosophy, as well as with current and historical physics. But what will make the proposed course truly unique is that this study of the physics and philosophy of time will be juxtaposed with an equally intense study of representations of time in 20th century literature and film. Bringing these two modes of humanistic inquiry into contact is an exciting exercise in intellectual pluralism and cross-cultural study (in the sense of C. P. Snow's two cultures). With terminal degrees in physics, philosophy, and creative writing, I am in an unusual position to instruct a course of this nature. Developing it will be an opportunity for me to expand my scholarly range by synthesizing my work in these diverse fields.

The proposed duration of the grant is 36 months. Summer 2014 will be devoted to studying the core readings and associated secondary sources. I will then spend Fall 2014 and Winter 2015 constructing the final syllabus, preparing class materials, and developing a course website. The course will first be offered in Spring 2015. It will be evaluated using UCI's course evaluation system and by interviews with enrolled students conducted by honors program advisors. I will revise the course during the summer of 2015 in light of this feedback, and offer it again during the 2016-7 academic year. If the course is successful, I will investigate developing it for an online platform, such as Coursera, with whom UCI has a partnership.

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