



## A Day in the Life of... Douglas Hofstadter

**Title:** College of Arts and Sciences Professor of Cognitive Science; Director, Center for Research on Concepts and Cognition, Indiana University, Bloomington.

**Department:** I am vaguely associated with several departments at Indiana University, including Computer Science, Psychology, Philosophy, and Comparative Literature, but in truth I have very little to do with any of those departments. I teach seminars (for graduates and undergraduates alike) that have to do with my passions, and those passions range from alphabetic design to poetry translation to sexist language to Euclidean geometry to discovery in physics to the mechanisms of artistic creativity, and many other things besides. Here at IU, I'm more a floating faculty member than a member of any specific department or departments.

**Institution:** Indiana University

**What I work on:** Various things. My graduate students and I have worked for many years on developing computer models of how human thinking works, and since I believe very deeply that abstraction (also called "high-level perception") and analogy-making constitute the core and the essence of thinking, that's what we've always focused on. Over the years, we have designed and implemented quite a number of computer models -- Copycat, Metacat, and Letter Spirit among them -- that discover creative analogies in various microdomains. Letter Spirit, for instance, designs "gridfonts" -- lowercase alphabets ('a' through 'z') whose letters are made by selecting

straight line segments from a predefined grid. The idea is to realize all the letters in "the same spirit" (i.e., the same style), and of course to make many highly distinct spirits. This is a task in abstraction of a very high order, and yet it takes place in a tiny microworld. Most people in cognitive science have no concept of how deep microworlds can be, because some years ago it was unfortunately very trendy to pooh-pooh them, and many people fell for the propaganda that microworlds were outmoded and couldn't provide deep insight into thinking. How wrong they were! Just as in physics, the most profound of all the sciences, idealization plays a key role, and in cognitive science, idealization means isolating the essence of cognition in the smallest possible domain and then studying the hell out of it. That's what my students and I have done for over two decades, and the more we study microdomains, the richer we find them, rather than the reverse.

In addition to the computer-modeling work, I write books and I plunge myself headlong into many topics that are quite distant from the computer models just described. For instance, I recently spent five years learning to speak Russian (a lifelong goal), and one of my key means to this precious end was the unlikely activity of memorizing hundreds and hundreds of lines of sparkling poetry by Alexander Pushkin -- specifically, about 75 fourteen-line stanzas of his novel in verse "Eugene Onegin," which Russians universally consider to be not only the foundation but also the crown jewel of their very rich literature. After that, I wound up, very much to my own surprise, translating the novel into verse in English, doing my best to reflect the dazzling sonic and lyric beauty of the original. This was an amazing labor of love that I could never have predicted I would undertake.

I also do visual art of many sorts, and I study various branches of mathematics (I was a math major in college and did a great deal of research in those early days in number theory). With a friend a couple of years ago, I wrote a novel triggered by my intense feelings about the unconscious institutional sexism that I see spread throughout America, embodied, for instance, in phrases that range from "you guys" to "ballsy chick." As you can see, my interests are eclectic and rather hard to pigeonhole.

**How I arrived at my present job:** In 1977, when I thought of myself rather straightforwardly as a researcher in artificial intelligence, and when the only way to work in that field was to belong to a computer science department in some university, I applied to many computer science departments around the U.S. and Canada, and got nibbles from a few of them, including Indiana University. I came to Bloomington to

give a lecture, found the people very congenial and open-minded, and loved the campus, and when I was given an offer, I snapped it up. Since then, I have always felt that IU lived up to all that I had intuitively felt about it in that first three-day visit: it has supported me with great flexibility, allowing me (in fact, encouraging me) to explore highly diverse areas in a way that very few universities would ever do, and as a consequence, I have been able to come out with books that include philosophy ("The Mind's I"), comparative literature ("Eugene Onegin" and "Le Ton beau de Marot"), cognitive science ("Fluid Concepts and Creative Analogies"), and so forth.

**How I organize my day:** I'm not very organized in terms of my time. I tend to do most things in a last-minute way. I don't plan ahead a huge amount. I try to answer my email but I have far too much for any mortal ever to be able to handle, and so, to my regret, many interesting emails go totally unanswered, and I feel terrible -- and yet, I am only human. I am finite. If I were to answer all my email, I would cease to be the person that my readers want me to be, and would instead simply become a full-time letter-answering machine.

As for my work, I tend to read for an hour or two when I wake up, and then I do some email, and then I try to work at writing various things (e.g., this, but also hopefully articles and books) during the afternoon and evening. But I also try to run every other day, and I try to do activities with my two children as often as possible (with whom, incidentally, I speak only Italian, since they became bilingual in 1993-4 when I had a sabbatical in Italy), and I cook various dinners, and I talk with friends over the phone quite often.

It's hard to put any of this in any strict chronological order -- it's all quite jumbly and unpredictable. But, jumbly-scheduled or not, I always somehow wind up working very hard on the things that drive me passionately -- right now, for instance, the main intellectual thing I am concentrating on is reading about non-Euclidean geometry, with an eye to deeply internalizing it and having its strange counterintuitive properties come to be second nature to me (another lifelong goal of mine!). I spend a couple of hours a day studying it, and my favorite book for this purpose is the marvelous "Visual Complex Analysis" by Tristan Needham, which was not even written mainly for that purpose, but its Chapter 6 is so rich and so full of insights that I find it just terrific.

**Amount of time spent working daily (at home and office):** In my case, it's very hard to divide work from play or other aspects of life, so I can't give a good, sharp answer to this. Let's just say it could be as few as 4 hours a day to as many as 16

hours a day. Who knows?

**What I do to get myself thinking creatively:** I just look at the world and think about it. I watch myself thinking, and I also greatly enjoy observing my own errors. Ever since I was a teen-ager, I have been a fanatic observer and writer-down of errors of all sorts, especially linguistic ones, because I find them so fascinating. An example: one day in Italy, I was speaking by phone with a friend in Italian, and the conversation was winding down. As my closing remark, part of me wanted to say "Ciao" and another part of me wanted to say "Grazie" ("Thanks"); what came out of my mouth was "Grao!" I felt very embarrassed at this bizarre blend of two words, and I quickly tried to "repair the damage" by saying what I had meant, but since the two potential utterances were still competing in my brain for getting uttered, my mouth came out with a second, though much subtler, blend: "Giao" (sounding like "jow"), in which the initial (unvoiced) consonant of "Ciao" had been contaminated by the voicedness of the opening consonant cluster of "Grazie." "Grazie" was losing the battle, but it didn't go out without a fight! This is a typical example of how potential utterances compete inside one's brain and wind up manifesting themselves, or traces of themselves, in the most unexpected, most bizarre, most unanticipatable fashions in the words and phrases that wind up actually being produced (whether sonically or visually).

In any case, I don't need to "get myself thinking," because I'm always thinking about things. The problem is how to focus, how to select what to do next, how to find a long period during which I can concentrate without being distracted, and so forth.

**My problem-solving strategy:** I don't relate to the phrase, actually. I don't really think of what I do in terms of problem-solving. But if you insist on the phrase, then I'll have to interpret it in my own personal manner, which would be "my strategy for understanding things." I guess I mull them over from many viewpoints and try to find analogues to them in my preceding experience. I am always looking for analogies by which to understand new and unknown situations. So you could say that that is my "problem-solving strategy," I guess, although I would maintain that it is not just mine, but everyone's.

**What I do to relieve stress:** Sometimes I run. Sometimes I call up a friend and just let steam off. Sometimes I write a very emotion-packed email.

**My hero, mentor, or person that I admire and why:** Someone who deeply

influenced me was my math professor Gordon Latta, at Stanford, back in the early 1960's. Prof. Latta was simply so warm, so open to me and my ideas, so welcoming. I have never forgotten his kindness. There are many other people whom I admire, but he came to mind first, this time!

**What I do to mentor those who work with me:** I meet regularly with my grad students, often at local coffee houses, and we have long talks that range from our joint research to books we've read to highly personal matters. Once again, I emphasize that for me, there is no sharp line between personal life, play, and work. I also read their articles and doctoral dissertations with a fine-tooth comb, and I critique their writing on all levels, from fine points of typesetting (e.g., kerning) to where paragraph breaks should come, and so on, all the way up to the overall organization and flow of logic. I'm afraid that I terrify my students with the density of my red marks, but all I can say is that in the end, they wind up knowing how to write a lot better than when they came in -- and to me, that's a terribly important skill.

**How a negative event changed my life in a positive way:** I struggled and struggled for many years in grad school in physics, trying to understand particle physics. I failed at this, and came to detest that branch of physics (which I had grown up in love with) in a profound manner. And yet, 25 years or so later, I was lured back to particle physics by my once-ardent love for it, and I dared to tackle precisely some of the topics that in grad school I had hated the most, and after a while I finally came to understand them, at least to some extent. I felt vindicated in a way, because while I was doing this, many physicists told me that the era in which I had originally tried to learn particle physics was a period of terrible doldrums for the field, and it was no wonder that I had hated it.

In any case, out of this renewed encounter with physics, I developed a couple of highly personal lectures that were rooted precisely in my agonizing struggles during graduate school. I have presented these lectures in quite a few physics departments around the country in recent years, and to my great gratification, they often evoke very warm receptions, especially on the part of graduate students, who seem often to identify very deeply with my own intense struggles back in the days when I was a grad student. So although I still feel profoundly ambivalent about particle physics, I feel that I have somehow forged something meaningful out of my enormously frustrating love-hate relationship with the field over many years.

**One event or decision in my life I wish I could go back and change:** I always

look back at the year 1965-66 with great sadness, because it was a year that I had intended to study some unusual languages -- perhaps Hindi or Russian or Chinese, who knows? -- at the University of Paris. I went to Paris, got an apartment, and then tried to register at the university. The stupid bureaucrats, however, would not allow me to register for language courses because I had a Bachelor of Science degree (I'd been a math major at Stanford), and according to them, I would have had to have a Bachelor of Arts degree instead. Nothing I said budged their little bureaucrat-brains in the least, and since I absolutely HAD to be enrolled in a university in order to obtain a draft deferment (I wasn't going to get drafted and risk dying in Viet Nam!), I had to give up my dream of studying in Paris, and instead I went to London and enrolled in a totally different university and had a totally different kind of year. I have often felt enormous pangs of regret at not having had that opportunity to spend a year in Paris -- I loved France and the French language so deeply -- and it all resulted from the completely irrelevant fact that the U.S. was plunged into a stupid, pointless war at that time. That fact (plus the stupid stubbornness of a few French bureaucrats) changed my life (among many other people's lives!) forever. God knows how my life might have gone if I'd spent that year in Paris. Sigh...

**What values are the most important to me and what I value in others:** Honesty above all, plus compassion and insight into the human heart. I also treasure a lively sense of humor!

**What inspires, motivates, or gets me excited about my job on a daily basis:** What inspires me? In a word, beauty. The combination of deep ideas and a beautiful way of expressing them. The combination of great words, a great melody, and great harmonies in a song, whether popular or classical. A poem that is both witty and touching at the same time. Form united with content in the most intimate, satisfying manner -- that's what stokes my inner fire.

**Biography:** Douglas Hofstadter is College of Arts and Sciences Professor of Cognitive Science at Indiana University, where he also directs the Center for Research on Concepts and Cognition. He was born in New York City in 1945, and grew up largely in California, but with many excursions of various lengths to Europe. He jocularly calls himself "pilingual," meaning that in addition to his native English, he speaks French and Italian fluently and several other languages at varying fractional levels, which taken together sum to roughly 3.14159 "full" languages... He graduated from Stanford University in 1965 in mathematics, and from the University of Oregon in 1975 with a

Ph.D. in solid-state physics. His first book, "Gödel, Escher, Bach: An Eternal Golden Braid," which spans fields from the philosophy of mind to mathematical logic, molecular biology, and artificial intelligence, won the 1980 Pulitzer Prize for Nonfiction. His second book, "The Mind's I," co-edited with philosopher Daniel Dennett, is a highly accessible contribution to the understanding of consciousness and the word "I." Hofstadter wrote a multifaceted column for "Scientific American" from 1981 to 1983, and all his columns, which romped through many fields, including literature, science, and the arts, were collected in his third book, "Metamagical Themas." His fourth (Italian-only) book, "Ambigrammi," is a collection of original calligraphic art works and an introspective essay on the nature of creativity (which he prefers to call "discoverativity"). His fifth book, "Fluid Concepts and Creative Analogies," is an overview, co-written with his graduate students and post-docs, of two decades of attempts to simulate human analogy-making and creativity with computer models. His sixth book, "Le Ton beau de Marot," is a wide-ranging study of creative literary translation and is based on the belief that form and content must play equal roles; along the way hundreds of examples of the art of creative translation are given. His most recent book is a verse translation of Alexander Pushkin's novel-in-verse "Eugene Onegin." Aside from his research and writings in cognitive science, Hofstadter has contributed to theoretical physics and mathematics, composed piano music and created visual art, and written on error-making and sexism. It is appropriate that his cognitive-science research is focused primarily on analogy-making and creativity, since his own thinking and writing are pervaded by analogy and since he has created in many fields, both scientific and artistic. Hofstadter's own self-characterization is: "perpetually in search of beauty."