Have you seen us yet? Have you seen us dart around Turlington or the Architecture building? If not, then we're doing our job correctly.

It goes by many names: free running, extreme running, urban ninja-ing... but officially, it's called parkour. It's a form of exercise for some and an art-form for others. Hence, there are many ways to describe it. Here's how to describe it to physics majors: parkour is getting from point A to point B by minimizing the linear time and distance in space-time. In layman's terms: running around, jumping over stuff while trying to look as cool as possible. Shimmying across ledges, climbing trees, jumping off small buildings, jumping across deadly gaps... that's what it's about.

For example, if a staircase on your way to class has a handrail supported by several vertical beams, why climb the staircase? That takes way too long. Instead, run perpendicularly to a linear stretch of the staircase (preferably near its highest point), jump up, and grab the vertical support beams. Pull yourself up using the beams, grab the handrail, and vault over it (a "thief" vault always looks good). This is an example of distance minimization: \( \sqrt{a^2 + b^2 + c^2} \). Who actually goes around and climbs all those stairs?

You can also minimize the time dimension. A common thing to do is take a longer path to a destination, when you still get there faster than taking the "regular" path. On an average day of parkouring, you will jump across a few objects or buildings. Sometimes it's faster to run up and climb onto the roof, "cat" onto a different building, and slide down a gutter. Even if it only saves a few seconds, if you accumulate a bunch of those, you get more parkour!

The word parkour is French, as is the concept. Practiced daily by founder David Belle, a quick search on YouTube for his name retrieves hundreds of videos showcasing his mastery. You may have seen him in the movie District B13. Movies starring Jason Statham (The Transporter) or Jackie Chan also feature extended parkour scenes. Don't you love it when Jackie Chan "tic-tacs" two walls and climbs onto something high?
ANTENNAE PHYSICS

In today’s world of i-toys and PDAs, radio frequency (RF) transmission is becoming more and more essential. A college student’s e-life is becoming a status symbol, transforming many into Facebook or Myspace junkies. As a result, antennas for the laptop, cell phone, PDA, and i-toy are being pushed to their limits to provide the best quality signal at the greatest range... or are they? Despite the exponential reliance on wireless RF communication, the ranges provided by our precisely-priced electronics are barely noticeable!

Dictionary.com defines an antenna as a conductor by which electromagnetic waves are sent out or received, consisting commonly of a wire or set of wires. For this article, we’ll focus on the receptive properties of the antenna which affects most of us... the cell phone. If you were to start with using that gum wrapper in your pocket as an antenna, the first concern would be tuning its frequency to that of the wireless transmitter. But beginning with any manufactured phone antenna which will be accurately tuned, the next most important concern to us road warriors is an antenna’s gain (measured in decibels) which denotes its power of receiving or transmitting a signal. Upping the gain of your antenna generally translates into a greater range as does removing interference from the path between you and the wireless transmitter.

There are two scales that antennas are commonly measured on: dBi and dBd. dBi is approximately 2 units higher than dBd, 5dB = 3dBi. 2.2dBi = 0 dBd, etc. Furthermore, the antenna in or on your cellular phone as you purchased it from the retailer is likely a 0dBd (2.2dBi) antenna and should not be forced to perform in excess of 12.2 dBd. To accomplish a significant gain in gain, I will give you the following equations and methods and I leave it to you to answer this question. How long should your antenna be?

1. The voltage across the base of your antenna and the amperage provided by your cell phone’s battery are both essential to know.
2. Your cell phone operates on the 2.4 Ghz band meaning the frequencies being transmitted range between 2.4 and 2.4835GHz. Furthermore, your antenna’s most sensitive frequency or central frequency should lie in the middle of this band.
3. Photons still travel at 3x10^8 (m/s) through our assumed vacuous medium.
4. The signal’s period times its frequency is equal to 1.
5. For a pigtail antenna (simple and effective) there are circular discs around the central wire every quarter of the desired wavelength starting from the tip of the antenna.
6. After 6 or 7 wavelengths the gain increase provided by the antenna decreases rapidly so don’t exceed this.
7. Stripped coaxial cable is an essential for your home-made antenna.

more info at: http://www.criterioncellular.com/tutorials/ allaboutgain.html

THE HERTZ FOUNDATION

When applying for grad school, there are a number of things that you will want to take care of. Figure out what you want to do your graduate studies in, research the schools in your field, and apply for fellowships. One fellowship that you definitely will want to consider is the Hertz Foundation Graduate Fellowship.

The Hertz Foundation Graduate Fellowship is a fellowship specifically for applied physical sciences. According to the Hertz foundation website (http://www.hertzfoundation.org/fields.shtml), the term “applied physical sciences” is construed very broadly to mean “fields of endeavor in which one applies, invents, and/or develops results from the basic physical sciences to generate solutions to problems of comparatively near-term, widespread human interest.”

The award consists of a cost of education allowance, plus a stipend. The cost of education allowance is accepted by graduate schools to pay all costs normally associated with going to school, such as tuition and course fees. The stipend is currently $28,000 per year. According to the Hertz Foundation, “The Foundation’s standing policy is that they will be structured to be the most attractive in their class in both material terms and duration of tenure.”

Applications for the hertz fellowship are due at the end of October. It is too late to apply this year for a Hertz Fellowship, but now is a good time to start preparing for next year. Try to impress your professors with a desire to learn, and it will be easier to get a good recommendation from them (plus you will probably learn more from your classes, which is always a good thing). Don’t just ask your professor for a letter of recommendation; let him or her know everything about you. Be prepared to answer questions, and don’t be afraid to volunteer information about yourself.

One thing that will help your application greatly is if you can mention research that you have already done. To do this, find an area of research that you are interested in, and go for it. This will help you in three ways. First, it will directly give you research experience in an area of physical science. Second, you will gain a much better understanding in the field you are researching than you ever could in class. Finally, you will get a chance to work more closely with your professor.

When writing the application essay, there are a few things you should keep in mind. First, the people at the Hertz foundation are well versed in their field; b.s. won’t cut it. Second, they are reviewing thousands of applications; unless your application stands out in some way, it won’t be remembered. Third, the Hertz fellowship isn’t necessarily looking for the brightest or the student with the highest grades, it is looking for exceptional creativity. Finally, make sure your essay is well written. Ask your professor to look over it for content. Go to the Broward Reading and Writing center for a literary critique.

by Larry Camarota

by Larry Camarota

Inside Undergraduate Physics Newsletter - December 2006
October the Fifth, Sixteen Hundred and Fifty Nine
Hello, blank diary. My name is Isaac Newton and I am 17 years old, living in Woolsthorpe-by-Colsterworth. I have never before written in a diary, yet this comes rather naturally to me. I’m writing here because I need to vent. I never met my father, who died a few months prior to my birth. My mother remarried, and now she is trying to force me to become a farmer, because this father of mine whom I have never met was. The thing is: I despise the work. I was so much happier in school, and so much better in a classroom than I am out in the field. I just wish someone could talk sense into her, so that I could finish my schooling.

September the Eighth, Sixteen Hundred and Sixty Four
I am afraid it has been some time since last I wrote here. I am currently pursuing a degree at Trinity College of Cambridge University. The headmaster of The King’s School - my former school - managed to talk my mother into allowing me to finish my final year of primary schooling. Over the course of my final year, I fell in love with Anne Storey - the daughter of the apothecary in whose house I was staying. Coming here, however, and delving ever deeper into the works of the scientific giants of the past demanded ever more and more of my time, and the flame between Anne and I rather died out. I have become largely enveloped in my studies, and have begun to work on some new concepts in mathematics. I hear, though, that this Plague has the university contemplating closing. I very much hope I can earn my degree before that happens.

February the Seventh, Sixteen Hundred and Ninety
Fancy coming across this old gem after some twenty years! How exciting. I suppose my hand of late has been busy in other writings, for I have become a rather prominent figure over the past few years. My Principia is a major reason for that. I managed in it to describe the most fundamental laws of nature. Very exciting stuff. Although I wish I had a little more to say on gravity. That has really been bothering me. I mean, it’ nice to have something down about the mathematics of it all, but what is gravity, really? I suppose there is only so much to be gleaned from falling apples, and I suppose I must leave further development on the subject to other minds. I have not been busy just in mechanics. My advancements in optics – particularly my hypothesis on the particulate nature of light, and my mirror based telescopes which remove some of the problems that arise when light is refracted – have opened some eyes. There is this rather aggravating event developing around one of my former collaborators, Gottfried Leibniz. I have reason to believe his recent papers in which he does not list my name are based at least partly on my work in the calculus – work that I never published for fear it would receive a far less friendly welcome than Leibniz’s papers have. I hope this does not turn into an ugly affair.

March the Fourteenth, Seventeen Hundred and Twenty
I do not know why I still bother to use this when I happen across it the rare year here and there. I suppose writing once more, just for fun, cannot hurt though. The whole dispute with the late Mr. Leibniz grew very much out of hand, I am afraid. Allegations ran rampant, and there was nothing one way or the other that could ever be proven. He was a great mind, and no doubt was able to invent the calculus eventually, whether he had help from me or no. I have here nothing more to say on the subject, and I suppose history will see the affair its own way, regardless. On a different note: I was, some fifteen years ago, knighted. Oddly enough that was for the work I did as the warden of the mint and my crusade against counterfeiting, rather than for my religious or scientific writings. As I grow older, I dwell ever more and more on the nature of God and religion. Never have I doubted the existence of God, even if my views do not coincide with those of the Anglican Church. I wonder, though, if my considerably more voluminous religious writings will be held in as high regard as my scientific ones. I fear they shan’t.
A LECTURE BY RICHARD FEYNMAN

This past November 9, the legendary Richard Feynman gave a lecture entitled "The relation of mathematics to physics." The lecture, of course, was on film, but nevertheless, it brought Feynman to life, especially for those who had only read of him in books and journals.

In the lecture, Feynman described examples of how the beauty of mathematics aids physicists in characterizing natural phenomena and how physicists employ mathematics to construct models to formulate theories and laws. He provided a general overview of the laws of physics and carefully analyzed a selection of them to bring out their common features and unify them into a more general framework that led to a deeper understanding. A particularly memorable point of the lecture was Feynman's conviction that the importance of a physical law rests on not "how clever we are to have found it out, but ... how clever nature is to pay attention to it." One physical law that Feynman revisited time and again was the Law of Gravitation. From giving a brief historical tour of its discovery and illustrating the mathematics behind it, this law was the prime example of the interconnectedness between physics and mathematics. Other universal principles that Feynman considered were those of symmetry, time-irreversibility, and conservation, and how they bridged classical and modern physics. Mathematics is the language of physics, and Feynman felt that if there were a complete theory of all natural phenomena, its foundations would be a set of self-contained mathematical axioms. The lecture was delivered in a masterful way that left the audience with a more profound appreciation of nature.

The lecture was part of a series called "The Character of Physical Law." These lectures were given as part of the Messenger Lectures at Cornell University in November of 1964, and recorded for television by the BBC. At the time, Feynman was a professor at the California Institute of Technology, and had already risen to fame; he would win the Nobel Prize a year later. What made these lectures so more remarkable was that Feynman had an uncanny ability to convey the excitement of science and to explain complex concepts in an accessible manner.

ACROSS
1. charge flowing per unit time
3. energy is proportional to frequency using his constant
4. painful frequency
6. mass of a photon
9. "a not-quite-dry gluon", particle that travels faster than light
10. Canadian math software
11. an inner product space crucial to quantum mechanics
12. change in direction of a wave as it passes between media
13. physicist; cookie, unit of force
15. an assignment of a physical quantity to every point in space
16. a relatively important physicist
17. abrv. for "rubber" handbook of constants
18. radiant flux incident per unit area of a surface

DOWN
2. a principle of quantum mechanics, or is it?
3. quantized mode of vibration in a rigid crystal lattice
5. Tomonaga, Schwinger, and Feynman shared the 1965 Nobel Prize in Physics "for their fundamental work in quantum ___.__._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._._.