The Photon: Spotlight

Physics Alumni | UM Physics Research

On Alumna Jay Vaishnav

by Jay Vaishnav, Class of 2000

Jay bids a fond farewell to the Department before starting on her newest journey

At some point, you may have noticed a big table in the front of Room 0405 (the classroom in the basement). You may have also noticed that the table has wheels on the bottom, is hollow and has a top that opens. One day, my PHYS272 class decided that one of us should sit inside the table and roll it around during lecture, in apparent violation of Newton's Laws. My friend climbed into the table; we had just closed the top when the professor walked in. As the lecture began, we choked back our giggles and waited. We were waiting for anything. Anything at all. Apparently, nobody had noticed that the table was extremely heavy. At 10:50, the disappointed class opened the table and pulled one very rumpled physics major out. We never did explain to the professor exactly why one of his students had spent an entire lecture hiding in the table. Fortunately, though, I don't think he took it personally.

By now, most of my classmates from that class, and other classes, have graduated-and the variety of things that they are doing amazes me. I am proud to say that I have friends who are going to teach high school (Amy Cohen, '99), formulate science policy for the DOE (Christine Chalk, '00), and study string theory (Andres Collinucci, '00). Everybody seems so professional now; it is hard to believe that a few semesters ago we were all sitting in the dark, fumbling through optics labs together.

This physics department is one of the biggest in the world, but to me, it has always seemed just small enough to feel like home. I have loved the weekly teas and colloquia, and the Women in Physics lunches, and the way everybody knows everybody else's names. Furthermore, I have had several small classes, for which I am grateful because they are wonderful for asking questions and getting to know fellow students. One rainy Monday morning my sophomore year, being the only student that braved the weather to come to class, I got my own special lecture. That felt weird enough to begin with, but, actually, it was even stranger-there were two professors. A year later (and back in Room 0405), I had another very small class. Once, the professor was a few minutes late. The prospect of yet another two-hour lecture in the

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On Quantum Chromodynamics

Solving Hadron Structure Using High-Performance Computers

by Xiangdong Ji
Associate Professor, UM Physics

Summary: First, scientists discovered the atom. Then, they discovered its basic structure--electrons orbiting a nucleus made up of protons and neutrons. Both, amazing discoveries, but, true to form, scientists didn't stop there. Now, they've gone deeper into atom, examining the protons and neutrons found in the atom's nucleus. This article discusses how physicists at Maryland are learning how protons and neutrons work.

What is the origin of the baryonic mass in the Universe? Where does the proton get its spin (which is the key for the operation of Magnetic Resonance Imaging [MRI])? These important physics questions lie at the heart of the solutions of the fundamental theory of strong interactions---quantum chromodynamics (QCD).

In the thirty years since it was formulated, directly solving QCD with available analytical techniques has proven exceedingly difficult. However, following the suggestion of 1982 Nobel Laureate Ken Wilson, simulating QCD on discrete spacetime lattices has made steady progress over the last two and a half decades. At the moment, the so-called ``lattice QCD'' is at threshold of answering many important questions about the physics of strong interactions, and of making a crucial impact on high-energy and nuclear experiments at Stanford Linear Accelerator Center (SLAC), Brookhaven National Lab (BNL) and Jefferson Lab (JLab).

Quantum chromodynamics was discovered in the beginning of the 1970's following a series of landmark theoretical developments by, among others, **Murray Gell-Mann**, **George**

Zweig (Caltech), **O. W. Greenberg** (Maryland), **Yoshiro Nambu** (Chicago), **David Gross** (UCSB) and **Frank Milczek**

solution of the theory is written in the form of
the ``Feynman path integral" which involve one ordinary integral per physical degree of freedom. Third, the time is taken to be imaginary instead of real so

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basement was painful to every single one of us. Being the diligent student that I am, I pointed out that, if we all left, there wouldn't be a class. The idea went over well. Unfortunately, there is only one staircase going down to 0405, and while sneaking up it, we collided with the professor, who was on his way down. "We were just, um, going up to your office. Um, to find you," we rather sheepishly explained, and promptly turned around.

No amount of reminiscing would be complete unless I mentioned undergraduate research. Far more importantly than the research itself, being involved with the chaos group gave me the opportunity to meet graduate students and postdocs, attend colloquia and thesis defenses, and generally get a feel for what the rest of my life was going to be like. So, once again, thank you, Prof. Ott!

I visited two graduate schools over Spring Break in an attempt to pick one. One was on the East Coast, the other was on the West Coast. The East Coast school was dreary, rainy, and freezing. The West Coast school had a breathtakingly beautiful campus with ponds and orange trees. But after five minutes at the East Coast school, I fell madly in love. You see, their physics department reminded me of Maryland's. The East Coast school was Harvard University, which I will enter in September. Eventually, I hope to study theoretical AMO (atomic, molecular, and optical) physics, which deals with nifty subjects like quantum chaos. And if a genie suddenly popped out of Jackson's Classical Electrodynamics and granted me one wish, I would wish to be as happy in Harvard's physics department as I have been here in Maryland's.

• See Jay's profile

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