From Alumnus Mike Muehlemann  
(BS '82, MS '86)

It was so wonderful to return to my UMR home to give the Physics Homecoming Colloquium this past October. The welcome was warm, and it was a special treat seeing many faculty and friends once again at the generous reception. While there I couldn't believe that almost 15 years had passed, and yet walking the halls again made me feel like it had only been last week.

Upon leaving UMR, I jumped immediately into the business world as a quasi-engineer/semi-scientist. As it turns out, we physics geeks do quite well at taking basic research and developing it into tangible products, a trait that turns out to be quite valuable in today's world. In the process, I have had the great honor to meet and work with a lot of physicists and engineers on both the east and west coasts. I can tell you that very few of them have been as well prepared technically as the average UMR grad. This is something that every professor can be proud of, and something that can be a real inspiration for any students trying to pull through their darkest hour.

I have really been blessed with great experiences since entering the business world, and I am so proud of my UMR Physics education that prepared me well to tackle a great number and diversity of projects and technologies. I spent my first five years after graduation at the German owned-Leybold-Inphicon GmbH, developing penning vacuum sensors, gauge controller electronics, capacitance manometers, and working on spinning rotor gauges and helium leak detectors. My most exciting development project was producing the first ever miniature Fourier Transform Ion Cyclotron Mass Spectrometer (FTICR). This PC based instrument (IBM-AT @6Mhz!) trapped ions in large magnetic orbits and measured their masses very precisely by determining the frequency of oscillation (\(\omega = qB/m\)). The relatively inexpensive technology was particularly well suited for resolving the small mass differences between molecules with the same nominal atomic mass (CO and N\(_2\) for example) and quantitatively measuring trace amounts of one with respect to the other with high accuracy. From there I spent a great deal of time researching Fourier Transform Infrared (FTIR) instruments to complement the product family. I spent time researching Michelson Interferometers, and got involved with license agreements for several interesting and clever interferometer variations that proved much more robust and reliable for industrial applications.

Shortly thereafter I was offered a job as Engineering Manager of a small start-up firm in the fiberoptics business. I decided to take the job because I always had the dream of striking off on my own, and thought that this would be a good way to see what it was all about. After about two years of management, marketing and direct customer exposure I was ready to try it for myself. I started Illumination Technologies, Inc. in 1992 and haven't looked back since. We manufacture illumination devices for the machine vision industry (www.illuminationtech.com). The vision industry is centered on computerized inspection equipment that uses CCD cameras to acquire digital images of products that software can then use to make quantitative determinations of product quality on everything from dimensional tolerance to aesthetic appearance. We sell our products throughout the world and continue to grow with a vibrant industry and technology base.

Our latest developments are directed at photonic applications in the biotechnology arena. We have recently licensed some spectacular technology which uses photons and chemical processes to enhance the detection of harmful antigens including HIV, hepatitis, e-coli, genetic disorders, and a variety of cancerous tumors. This new division is developing an instrument that has demonstrated increased dynamic ranges of standard ELISA readers by factors of 50 to 100 times, while shortening incubation times from 4 hours to 4 minutes. This means that these types of diseases can be detected much earlier in their infectious stages, much faster and at much lower concentrations than ever before. I am excited about these new biophysical challenges, and find myself continually challenged to learn at the feverish pace established over 15 years ago at UMR.

While my UMR education prepared me for many things, I wish that I had spent more time in the management school and with some Business 101 classes. However, like so many other challenges, business is a problem that can be solved by breaking it down into basics - a technique taught well within the city limits of Rolla, MO. In any event, the entrepreneurial experience is one that is truly unique and which can be simultaneously very challenging, extremely nerve wracking, and unbelievably rewarding. If any of our students or alumni ever get the urge to have an entrepreneurial seizure, I would be more than happy to talk to them about (or out of it)!

Of course there is more to life than work, yet achieving a balance always seems to be non-trivial and involves more work than one would expect. During it all I actually managed to fall in love and be part of a wonderful family. I owe it all to the wonderful human being that I married, Lorraine, my soul-mate forever, and we are in the process of raising (or trying to raise) four children. Spanking as a techno-geek, nothing is as complex as children! It seems that as soon as all the data is in, as soon as you think you have them characterized, the subjects change. They are truly dynamically non-linear.

I wish you all a peaceful and happy new millennium and hope that you all continue to do well and serve well. I think of you all often and look forward to returning in the near future when we can catch up with one another again.

P.S. I am still having those annoying dreams about 2-3 times a year! You know the one, where you are looking to take that last final exam on graduation day and realize that you have never been to the class! *Do they ever stop??*