

Alumni News from the IUP Geoscience Department

# GEO-TIDINGS

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## ALUMNI REUNION '99

As we told you in our last issue of Geo-tidings, we hope to make our fall Homecoming Banquet an annual re-union for Geoscience alumni who graduated five, ten, fifteen, twenty and twenty-five years ago. This year, we're especially inviting those of you who graduated in 1969, 1974, 1979, 1984, 1989 and 1994 to come and celebrate with your classmates and other contemporaries! The alumni banquet will be held on Friday, October 8 at the Rustic Lodge in Indiana, and your invitation is enclosed. We hope you will attend – we had a great time last year!

This year we'll be celebrating IUP's 125<sup>th</sup> anniversary as well as the upcoming millennium. This is a time of change and growth for the department – we have a new chair, Darlene Richardson, who will talk about the department's goals and plans for the future. We'll update you on the status of our two new scholWW ahe33(')0.567519(62t)16Tf745(8)-5.10894(h)-5

# GEOSCIENCE STAFF UPDATES

## **KEITH PUTIRKA**

The Geoscience Department is proud to announce the addition of Dr. Keith Putirka as our newest permanent faculty member, filling the position made vacant by the retirement of Fred Park. Dr. Putirka got his undergraduate degree at California State University at Northridge, his master's degree at California State University of Los Angeles and his doctorate at Columbia University's Lamont-Doherty Lab. He first contacted the department in 1997, when we were looking for a temporary replacement for Mr. Park. Unfortunately, Keith's grant-funded post-doctoral research at Lawrence Livermore National Laboratory in California prevented him from accepting our offer that year. We were so impressed with him, however, that we invited him to re-apply for the permanent petrology position that opened the following year. After an intensive nationwide search, Dr. Putirka's combination of exciting research on volcanic magma sources and his strong background in education made him our top choice for filling the position. Fortunately, Keith came to visit and decided that he liked us, too! He accepted our job offer, and he and

# FACULTY RESEARCH CORNER

## JOHN TAYLOR

Trilobite faunas on the marine shelves around our continent suffered a series of extinctions during the Late Cambrian. Numerous causes have been proposed, including oceanic overturn or destratification, flooding of the platform with cool/anoxic waters, and eustatic rise or fall of sea level. There is much debate about the validity of these proposed events, due to the ambiguous nature of the sedimentological data and insufficient precision of correlation in earlier studies. To tackle the problem, we've assembled a research team led by three Principle Investigators: a biostratigrapher (yours truly), a sedimentologist (Paul Myrow, Colorado College) and a chemostratigrapher (Rob Ripperdan, University of Puerto Rico). Precise sampling of Upper Cambrian strata in Wyoming, Montana, and the southwestern U.S. will allow assembly of an integrated stratigraphic framework in which we will reconstruct sea level behavior (as recorded in the succession of lithofacies and sequence boundaries) and identify paleoceanographic events (reflected in the carbon isotope stratigraphy) and bioevents (extinction horizons identified by trilobites, conodonts, and other invertebrates). We will thus establish whether extinction horizons are marked by isotopic anomalies and/or lithofacies shifts, suggesting that paleoceanographic events forced the faunal changes. The precise time-stratigraphic framework developed in this study will also provide necessary temporal constraints for future chemostratigraphic, paleomagnetic, and paleobiologic studies of this important stratigraphic interval. Other participants in the project, which is funded by the National Science Foundation, include alumni James Loch and John Repetski. The grant also includes funds to support 6-8 IUP students as field and lab assistants over the next three years. Dr. Taylor asks any earth science teachers with students interested in paleontology to point them toward IUP, as there will be many research opportunities available for them in the coming years.

## KEITH PUTIRKA

All of the components that make our planet habitable have evolved through volcanic activity. Earth's crust, atmosphere and oceans are each the result of partial melting in Earth's mantle, and the upward movement of this buoyant liquid. Because volcanism is fundamental to planetary evolution, it is critical for us to understand the composition of the volcanic source region and the physical conditions that lead to the eruption of lava. My research involves the development of equations for calculating the temperatures and pressures of crystallization and partial melting. I have recently applied such expressions to examine volcanism at Hawaii. To grasp the importance of Hawaii, first consider that Mauna Loa is larger than mount Everest when its height is measured from the ocean floor. Mauna Loa is thus the most prominent geographical feature of our planet. To create such a volcano we need to produce an enormous amount of melt—and to create a lot of melt, we must have very high temperatures in the mantle. But how hot? And how deep in the mantle does melting begin? Equations calibrated from experimental studies indicate that melting begins at depths of about 300-400 km, and that melting temperatures approach 2100 K. Significantly, while 400 km may seem deep, these calculations show that even the largest active mantle plume on our planet does not involve melting of the lower mantle (670-2850 km depth). At IUP our plan is to continue this work by having students 1) calibrate new equations from existing experimental data, and 2) apply existing tools to understand volcanism in various regions. Top prospects for field-based research include the Basin and Range province of eastern California, the Snake River Plain in Idaho, and the Absaroka volcanic field of Montana-Wyoming. In addition, the experimental facilities at laboratories in California (Livermore), Canada (Calgary), Japan (Misasa) and New York (Lamont-Doherty Earth Observatory) have been made available, and students will likely be involved in the collection of new experimental data.





PA (I don't know how I feel about that!) My cooperating teacher (from Indiana High School) told me that he would occasionally visit a quarry in Kentland, IN (about an hour SW of me) to collect tektites. Apparently this quarry is an impact site. I may visit soon. The Purdue professors have been very helpful in assisting me in Indiana geology. Unfortunately, I do not find it to be all that exciting. I now know to







# The Geoscience Roll of Honor

The following alumni, staff and friends have contributed to the Geoscience Fund over the past two years. Is your name on the list? Would you like to see it there? Just use our convenient donation form below to send in your contributions to any of our departmental funds. And thanks to all our benefactors, past and present!

## **Benefactors of the Geoscience Fund:**

**Charles Bove**  
**Catherine Brier**

**Want to take a field trip, but just don't have the time?**