
A f t e r m a t h

Mount St. Helens on Campus

If you are new in our department you may wonder why old timers, when they arrive in the morning, cheerfully greet each other by saying "Has there been a flood yet?" This is due to our having been traumatized in July of 2002 when we had a major flood that wiped out our computing facilities for a week, and air conditioning and some other utilities for most of the summer.

On Thursday, September 23, we had another flood that at first looked like a replay of that past experience. Sometime between 5am and 6am, a high pressure hot water line broke close to the northeast corner of LCB. The temperature of the water in those pipes is approximately 450 degrees, and the pressure is around 400 pounds per square inch. The water is used for heating. A break in one of those lines can cause injury and severe local damage. In this case the water washed out a crater to a depth of about 10 feet. It gushed to a height roughly that of the roof of LCB. It accumulated on the north side of the building. (The "construction north" side of LCB actually faces northeast.) Water seeped into the building, and entered its bottom floor through conduits carrying electric cables. It washed sand and debris into the building and pooled knee deep in front of the north door. It entered offices and our machine room in the northeast corner. A small amount of water also entered the math center.

Luckily the damage to the math department was minimal. The carpet needed cleaning in places, but it survived. A few baseboards warped and need replacement. A bit of paint peeled. None of our equipment was damaged. Utilities and computing services remained intact throughout the event.

The pipe that broke in 2002 was a new water main installed during the renovation of LCB. The pipe that broke this time predates the renovation, and the break could have occurred anywhere on campus. It was just bad luck that it happened so close to our department.



Our recent crater.

A Prominent Alumnus

by E.S. Folias

James Walker, a staff scientist at Southwest Research Institute in San Antonio, Texas, and an alumnus of the U of U Department of Mathematics, will present the departmental colloquium on Thursday, November 4 at 4:15 PM in JWB 335.

Walker attended Murray High School through his junior year and enrolled at the U of U in the summer of 1981 (at the age of 16). He completed his B.S. degree in mathematics (June of 1983) with a minor in physics. Subsequently, he went on a two year mission for the LDS church, after which he returned to the U., where he completed his M.A. degree, also in mathematics (June of 1987), while simultaneously working towards a Ph.D. degree in Applied Mathematics, which he completed in June of 1988. The emphasis of his Ph.D. thesis was the failure characteristics of layered-composite material systems, in the presence of external waves, under the direction of Tim Folias.

As a result of his significant contributions to science, in October of 2004 Walker was selected by Popular Science "as one of the 'Brilliant 10,' a list of 10 U.S. scientists to watch – people who are gaining recognition from their peers." He was recognized for bringing rigor to the field of impact physics and for his seminal work in impact modeling.

The general question that James addresses is: *How do projectiles go through armors?* The veloc-

ities in these studies range all the way from small arms fire to hypervelocity impacts onto space station and satellite structures. As a result of his efforts, he was successful in modeling, analytically, the penetration of projectiles through thick metal armors. The model produced, which is presently referred to as the Walker-Anderson model, is widely used for these type of problems. Its application includes ceramic tiles, vests worn by soldiers or police, and armor design for tanks, as well as shielding for the space station.

In general, Walker has a broad interest in the mechanical response of materials and systems. He has done research in the areas of wave propagation, plasticity, fracture and failure of metals, composites and ceramics. His work typically includes and combines large scale numerical simulations, analytical techniques and large scale experiments.

Walker has recently been supporting the Columbia Accident Investigation Board in their determination of the cause of the loss of the space shuttle Columbia. It is well known that the space shuttle Columbia was lost during re-entry on Saturday, February 1, 2003. Two days later, researchers at Southwest Research Institute (SWRI) were contacted to begin their role in the accident investigation. Due to some previous work carried out for NASA, SWRI had the experience, as well as the expertise, to carry out studies on the impact investigation and to determine whether the foam, observed on ascent, could have played a role in the loss of Columbia.

The rest is history. Walker, however, was a key player in the determination of the cause of the accident. He carried out the theoretical modeling for the failure and participated heavily in its experimental verification. Although the work was intense, the satisfaction of working on a problem that was so important to the space program and to this nation was more than just rewarding.

Personality!



Bo-Hae Im received her Ph.D. from Indiana University, Bloomington under the supervision of Dr. Michael Larsen. Her research interests are in algebraic number theory and arithmetic geometry, especially the rank of elliptic curves over large fields. She expects to broaden her research by working with several faculty members here, including Shekhar Khare, Gordan Savin, Wiesia Niziol, and others.

Bo-Hae moved to Utah in August. Her parents and her two sisters live in Korea. Her parents came to visit for the past two weeks and liked Salt Lake City a lot, especially the golf courses (they love golfing).

Bo-Hae likes to knit (sweaters, vests, etc.) when she has time. But she is not as good as her mom (a real pro) yet!

Bo-Hae enjoys talking to people, even though she doesn't talk much at first because she is shy around new people (but once she gets to know you she isn't shy anymore). She hopes to have more time to talk to people in the department about research and teaching, or anything else you are interested in.

Bo-Hae is enjoying being part of our department. She likes the people, who have all been helpful and friendly, and she really appreciates this. Stop by and talk with her sometime!

Just Kidding!



The real crater from the water line break. The picture on the front is the Kennecott Copper Mine.

The Aftermath is edited by Peter Alfeld and Angie Gardiner. Please contact either one of us if you have an idea or article to submit. (Issues of the newsletter will be archived on the web at:

www.math.utah.edu/newsletter