

Gene C. Ulmer, Professor of Geology



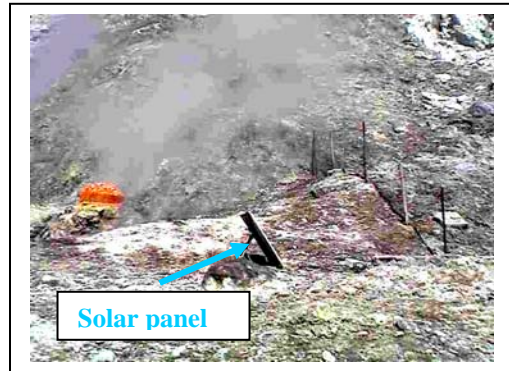
‘Traveling light’ to study Italian Aeolian Island Volcanoes in the Mediterranean
Photo Credit: Bill Shannon

On the occasion of the International Water Rock Meeting in Sardinia, Sicily and Naples, Italy, in 2001, organized field trips to the Mediterranean volcanoes were provided. This luggage was actually for about 20 people and was being taken by this ‘golf cart’ from the harbor of Stromboli to the shoreline hotel, which was to be the focus of the groups’ visit to this volcano.



Over the last two decades Dr. Ulmer has had two major research projects, each of which involve different aspects of volcanology and both of which are supported by the National Science Foundation.

One of these projects was/is to build a durable sensor that can aid in predicting when volcanic eruptions are about to happen. The sensor at the left is about one foot



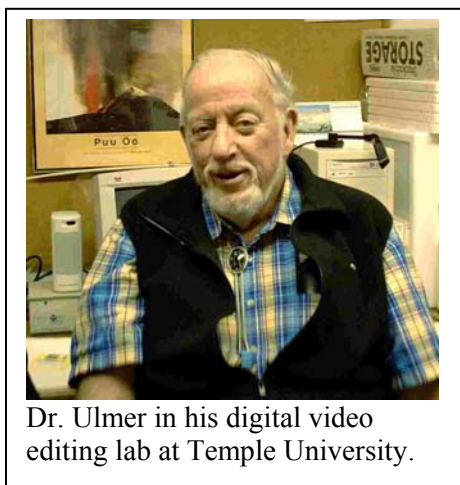
Solar panel

long as developed in his lab and is made from high tech ceramics (zirconium oxide), which allows insertion of the sensor probe into highly corrosive, high temperature and high-pressure, environments like the gas vent (boca or mouth) of volcanoes. One such is shown above (the orange area fenced in and with a solar panel to power similar sensors that are in place) at Solfatara, a volcano in a State Park in the suburbs of Naples, Italy.

The second project utilizes digital technology to develop interactive lesson plans for use in K-12 classrooms. The central themes of the 30 lesson plans being finalized are volcanology and geothermal energy. However, the lesson plans extend into the general sciences so that Biology, Chemistry, Engineering, Math and Physics are also taught with the excitement of the Volcanological and Geothermal images from



around the world. For example, the image at the right above was taken from the archives of the Hawaiian Volcano Observatory and shows lava overflowing a cliff on the side of Kilauea Volcano on the big island of Hawai'i. Note that the flow is displaying many colors from burnt umber (line C.) to orange (line B.) to yellow (line A.). The physical chemical principle involved in measuring temperature (as is being done by the man in the picture) is that color is a representation of actual temperature: for example, we all know that white hot is hotter than red hot. In the picture then, burnt umber is therefore colder than orange which is colder than yellow. Do the science....which of the three tongues of lava is still the hottest? This is the type of integrated general science and volcanology/geothermal energy exercise being prepared in the NSF Project for three student audience levels: elementary, secondary ed, and AP high school/early college.



Dr. Ulmer in his digital video editing lab at Temple University.

Dr. Ulmer started life as a chemist (B.S., Phi Beta Kappa, University of Cincinnati 1958), but was early on interested in Geology and so did graduate studies both at Cincinnati and then at the Pennsylvania State University ending up with a PhD in Geochemistry and Geophysics (1964). He then worked as a Ceramic and Refractory Engineer for five years at Bethlehem Steel's Homer Research Labs devising high temperature metallurgical furnace linings from abundant mineralogical materials, before coming to Temple University to teach Geology (1969).

In his 37 years at Temple, he took his rotational turn as Chair of Department (1974-1977) and has taught more than a dozen and a half different courses and published more than 200 publications ranging on topics as diverse as oxidation-reduction relationships among the minerals in the Earth's Interior; the origin of ores of platinum, of chromium and of diamonds; geothermal energy; utilization of coal and lignite fossil fuels; phase equilibria in ferrite semiconductors; and magnetic properties and the crystal chemistry of iron, magnesium, aluminum, chromium, and titanium spinel compounds. Even before his most recent NSF grant to prepare digital TV- and CD-lesson plans, he edited and co-edited some 12 one hour special-focus video programs on geological topics as supported by the Mellon Institute and Temple University. He has also edited two text books on geochemical and geophysical lab and field instrumentation (Springer Verlag, 1971, and Wiley & Sons, 1978). He is currently North American Editor for NEUES JAHRBUCH für MINERALOGIE.

He has been honored by the German Government with two Humboldt Research and Teaching Fellowships and by the U.S. Government with a Fulbright Fellowship, all in the early 1980's. He co-shared the Temple University Ebermann Research Award in 1988 with his colleague and fellow Geology faculty member, Dave Grandstaff, for their integrated work with the U.S. Department of Energy on Nuclear Waste Management Research during which period they trained and graduated, between them, 17 M.A. students who went on to work in this important societal environmental field.

He has really enjoyed getting into lava at volcanoes to study the lava's origins. He uses the gained knowledge to excite students into also becoming geology majors !



Photo credit: Jon Nyquist

Dr. Ulmer getting a hot lava pāhoehoe sample at Kilauea Volcano in Hawai'i...
and almost a hot foot...

[SMILE] in July of 2002 while he was working at the U.S. Geological Survey's Hawaiian Volcano Observatory during his residence there as he was digitally remastering part of their volcano image archives for use in preparing the NSF K-12 Science Lesson plans.