

Wetumpka Impact Crater Newsletter

Twenty-second edition / December 2022

The year 2022 was another eventful one for Wetumpka impact-crater research. In this annual newsletter, I will recap the events of the year and tell you some of what we have to look forward to in 2023 and beyond.

First, let me thank each of you for your support of Wetumpka impact-crater research! The many acts of kindness and support received during 2022 and prior years have made possible many aspects of our work at Wetumpka. We are also especially grateful to the many landowners in the Wetumpka area who have been so generous and allowed us to work on their property or visit their property for field trips. This is our 26th year working at the crater.

During 2022, our work at the crater was supported in part by some very generous contributions to the Wetumpka Impact Crater Fund given by local landowners and a small grant from the Poarch Creek Endowment Committee. We were most grateful for this support, which meant a lot to us during an absence of federal funding. In order to try to bridge the gap in funding, during 2022 I submitted proposals for a grant-funded project at Wetumpka to the Planetary Society, the American Chemical Society, and the Meteoritical Society. In these new proposals, we are focusing more on the astrobiological aspects of Wetumpka crater, namely how the crater could have been a harborage for life after impact, which has implications for the study of other planets where there were impacts into ancient oceans (e.g., Mars). Federal funding is very hard to obtain these days (less than 5% of all proposals to NASA are funded), so these other agencies, even though they have lower dollar limits than NASA, seem to be good potential funding venues. During 2023, we will find out if they will support us in our work and I will let you know who we come out.

As you may know, the March 2022 crater tours by the Crater Commission and the city of Wetumpka were cancelled, but the February 2023 tours will go forward! In all previous years (1999-2020), these tours and associated activities were assisted by my graduate students, who accompany attendees as guides in the tour vans. This will again be so in 2023, and the students expressed how much they are looking forward to the return of the tours in a few weeks. Over the years, the Crater Commission has done an outstanding job of keeping all interested parties informed of crater-related activities via their web page at www.wetumpkaimpactcratercommission.org. The 2023 tours will be on Saturday, February 25; and my lecture at the Civic Center will be at 6:30 p.m. on Thursday, February 23. I look forward to seeing old friends again there, and talking to the assembled group.

With last year being the 25th anniversary of the start of our work at the crater, I wanted to say a few things about the research history. During 1997, the Southeastern regional conference of the Geological Society of America was held in Auburn. For that meeting, the late Tony Neathery asked me to join him and some others in organizing a field trip to be associated with this conference, which would show attendees the crater and its geology. This was my first time working at Wetumpka, and the field trip was a great success. During the conference, I chided Tony, saying that he knew every geologist in Alabama and had connections with all companies doing geological business in Alabama, so he should be able to help us find funding to drill some core holes and seek evidence that would show whether or not Wetumpka's crater was of meteoritic origin. This

conversation led to funding from Vulcan Materials Company of Calera, Alabama, and the first two core holes ever drilled at Wetumpka were completed during the summer of 1998. These core holes on the Schroder's and Reeves' properties on Buck Ridge Road yielded the samples we needed to establish Wetumpka (in a peer-reviewed, scientific paper) as the 157th known impact crater on Earth. Since 1997, our efforts at AU have produced 9 major scientific papers in peer-reviewed journals and monographs, including the 2002 paper that established Wetumpka as a bona fide impact crater, plus five other published conference proceedings manuscripts published. Two guidebooks on Wetumpka were co-authored by us, and since 1998 there have been 87 conference presentations on Wetumpka, which were presented by either by me or my students. Some far off places where we have given conference papers about Wetumpka include Norway, Sweden, Spain, Morocco, South Africa, Brazil, and Japan. Seven AU students have earned Master's degrees (plus one Ph.D.) studying Wetumpka impact crater with me. During 2007, interest in Wetumpka brought 40 scientists from 19 countries to a GSA International Field Forum there, which was organized by me. Wetumpka has been a great well-spring of information about asteroid impacts into ancient oceans, like the shallow Gulf of Mexico, which covered southern Alabama, including the impact area, about 85 million years ago. Wetumpka is now known and recognized globally.

To enlarge on this history, I am attaching a short narrative (actually part 1 of a longer story to be concluded in next year's newsletter) that I prepared originally for our department. It contains some historical photographs and additional text about the crater story. If you would like copies of any of our papers on Wetumpka, please contact me by email.

Lately, we have been focusing our attention on samples already in the lab and on field work focused on collecting more of the impact-affected quartz boulders that occur in several places inside the crater. This work has progressed a great deal, and we are moving along with a manuscript for publication about our findings. There should be more to report on this work in the next newsletter. I also plan to start a book shortly about Wetumpka, the research history and findings, and other related topics.

Over the years, Wetumpka impact crater has gained a lot of attention and rarely does a week go by that I do not hear from someone via email asking for information or asking me questions. Some of these inquiries come from distant parts of the world and others from close to home. It is amazing how many people around the U.S. - and the world - know about Wetumpka. I continue to be hopeful of an interpretive center for Wetumpka so that people visiting the area, scientists and non-scientists, can more fully appreciate the crater and its history.

Appeal for funding – As in the past, we are always appreciative of your gifts toward our research. Gifts in any amount can be sent “in care of” me at the address below. Please make the check to “Auburn University” and write “gift for WICF” in the lower line.

If you know someone who would enjoy having this newsletter, please forward this or send me their e-mail. Again, I want to again thank all of you who have so loyally helped us over the years. Working at Wetumpka since 1997 has been a rare privilege for me and my students and colleagues. Best wishes for a very happy and healthy 2023!

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NEWSLETTER APPENDIX

Twenty-five years of research at Wetumpka impact crater, Elmore County:
Part 1 (1997-1998)

David T. King, Jr., Professor of Geology

Tony Neathery (1931-2015), formerly an assistant state geologist, was the first person to interpret large, the semi-circular topographic feature at Wetumpka as a possible impact crater. Tony's work was pioneering and went against previous interpretations that made Wetumpka impact crater out to be a depression on unknown origin (E. A. Smith's work of 1894) and an arcuate fault zone (G. W. Stose's work of 1926). Tony was not successful in finding definitive proof of impact, but he had put Wetumpka on the map of possible impact craters based on his 1969-1970 field studies and 1976 paper in the *Geological Society of America Bulletin*. For Tony, understanding Wetumpka impact crater was "unfinished business."

During 1997, Tony Neathery and I had the good fortune to spend some time together in the field at Wetumpka looking over key sites that he had found years before. Our being there had to do with planning for a conference field trip that was associated with the 1997 conference for the Southeastern Section of the Geological Society of America (SE-GSA), which was held in Auburn. It is quite common for geological conferences to include field trips to local areas, and this one was no exception. Joining us in this field trip effort was Dr. Lorraine Wolf, of our department, who was our geophysicist. In 1996, one of her students had used a gravimeter to measure the force of gravity at numerous points in a line across the crater from west to east (using mainly the right of way for the natural gas pipeline that crosses the whole crater). Her reduction of that gravity data, included in the guidebook for the 1997 SE-GSA field trip, showed a gravity profile of values that was consistent with the impact crater interpretation. Tony, Lorraine, and I compiled a field guidebook showing outcrops and maps, as well as the gravity interpretation.

The field trip was a great success. As I recall, about 30 people participated; some of them had come from great distances to be there particularly for the Wetumpka field trip. One was a well-known impact researcher, Dr. Christian Koeberl, who came from the University of Vienna to see the crater. During the field trip, I talked with Tony about joining together with him to seek funding for a core-drilling operation to seek proof of impact, if that could be found. Tony's original study, and my work thus far in 1997, did not reveal any impact-affected (or "shocked") mineral grains, which is one of the lines of evidence needed to prove impact origin of any crater feature. I reasoned that if we were to have a core drilled at depth, particularly at crater center where the shock pressures would be highest, that should give us the rock materials with the best chance of yielding evidence of high-pressure effect (shock effects). Also, the rock at depth should still contain trace amounts of certain key elements, like iridium, that would have been borne by the impacting asteroid.

Later on in 1997 (after the SE-GSA meeting was over), Tony was in touch with geologists at Vulcan Materials Company in Birmingham, and he obtained a verbal agreement that they would give in-kind support for a core-drilling operation at the crater. I prepared a proposal to Vulcan Materials and they agreed to fund a drilling operation for two bore holes near the crater's center. Vulcan sent a drilling crew of three people, which was led by Ms. Marsha Andrews. During drilling local news channels, CNN, and *Discovering Alabama* with Doug Jones visited the drill site and filmed stories. The *Discovering Alabama*

filming resulted in the production of episode #29, which is still available for purchase and is a YouTube video (see <https://www.youtube.com/watch?v=G1VhqrK79Ls>).

Below are some images from about 25 years ago. In next year's *Newsletter*, I will continue this historical account starting with the discoveries made during the interval 1998-2002 that proved Wetumpka is an impact crater – the 157th known impact crater on Earth at that time.



Vulcan Materials drill rig at Mr. Schroeder's home in Wetumpka. Drilling to ~ 300 m occurred from June 24 to July 18, 1998. We now refer to this as A.U. Scientific Borehole #98-01. The drill core from this well was studied by Reuben C. Johnson for his M.S. thesis (2007); and by us for our 2002 *EPSL* paper.



Me and Tony Neathery taking a break during drilling at Mr. Schroeder's home (June 1998).



Drill crew from Vulcan Materials Company; Marsha Andrews at left (July 1998).



The “discovery box” of drill core, A.U. Scientific Borehole #98-01 (“Schroeder’s well”), which is Box #23 (381.3 to 388.9 ft). The sample just above the yellow tag (“spl S-385.5”) yielded the first grains of impact-affected (shocked) quartz ever found at Wetumpka. A sample from the breccia in the next-to-last slot yielded chemical traces of the impacting asteroid (namely Co, Cr, Ni, and Ir). Impact-affected quartz and cosmic chemical traces were found in other parts of the 1998 drill cores as well, but the discovery made in this core box signaled that we had found two strong lines of evidence that Wetumpka was a bona fide impact structure. Results were published in 2002 in *Earth and Planetary Science Letters*.



← Shocked quartz grain in thin section from sample S-385.5. Impact-generated shock lamellae are the thin, closely spaced, sets of dark lines that occur in several orientations within the quartz crystal. Field of view is about 300 microns across. Crossed-polarized light. From our *EPSL* 2002 paper.