

Tar Heel Tailings

Special Interest Articles:

- Prez Sez
- Volcanic Rock Offers Insights Into Earth's Evolution
- Magma Held In 'Cold Storage' Before Giant Volcano Eruption
- Site Of Asteroid Impact Changed The History Of Life

Individual Highlights:

Prez Sez	1
Volcanic Rock Offers Insights Into Earth's Evolution	1
Treasurer's Report	2
September's Business Meeting Minutes	3
Magma Held In 'Cold Storage' Before Giant Volcano Eruption	5
Site Of Asteroid Impact Changed The History Of Life	6
Items For Auction!	7
Announcements	7
Vug Sites:	7

A newsletter for Gem and Mineral enthusiasts in and around the Raleigh, North Carolina area.

Prez Sez By Melissa Whitfield

Dear Members,

Thank you for the support you have given me this year as I have tried to fill some really big shoes as club President.

I am excited about the elections coming up and the new officers we will have. And while I may be leaving you as President, I still intend to volunteer where I can and help out where needed.

The excitement from the kids at Kids Night,

Continued on Page 4

Newly discovered volcanic rock minerals may offer new insights into earth's evolution

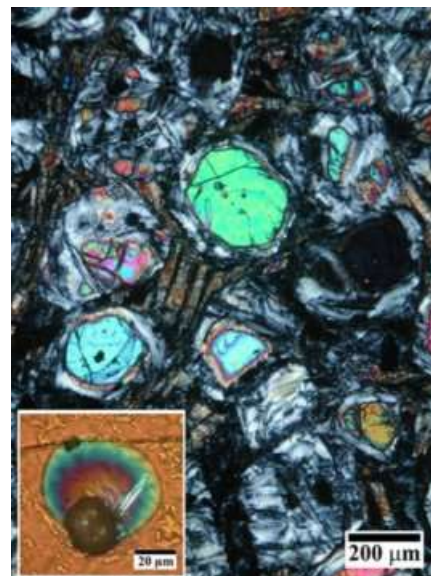
Scientists have found evidence showing that komatiites, or three-billion-year old volcanic rock found within the Earth's mantle, had a different composition than modern ones. Their discovery may offer new information about the first one billion years of Earth's development and early origins of life.

The first 1.5 billion years of Earth's evolution is subject to considerable uncertainty due to the lack of any significant rock record prior to four billion years ago and a very limited record until about three billion years ago. Rocks of this age are usually extensively altered making comparisons to modern rock quite difficult. In new research conducted at LSU, scientists have

found evidence showing that komatiites, three-billion-year old volcanic rock found within the Earth's mantle, had a different composition than modern ones. Their discovery may offer new information about the first

one billion years of Earth's development and early origins of life. Results of the team's work has been published in the October 2017 edition of *NATURE Geoscience*.

Continued on Page 4



Tar Heel Gem & Mineral Club, Inc.

10609 Chelsea Drive
Raleigh NC 27603

Melissa Whitfield – President
sanfordsgal@gmail.com
(919) 395-3441

Jack Fried – V-President
jackfried@aol.com
(919) 239-0142

Corinne Hummel – Treasurer
mchummel@mindspring.com
(919) 779-6220

Linda Searcy – Secretary
LJS0928@gmail.com
(919) 909-0750

Bob Bendelow – Librarian &
Committee Member
r.bendelow@earthlink.net
(919) 552-8175

George Harris – Committee
Member
GeorgeFHarris@yahoo.com
(919) 674-0243

George Harris – Newsletter Editor
GeorgeFHarris@yahoo.com
(919) 674-0243

Shirley Green – Field-Trip Coord.
richard60green@yahoo.com
(919) 848-1085

We're on the Web!

See us at:

www.tarheelclub.org

Program & Refreshments

REFRESHMENT SCHEDULE:

Coordinator: Loretta Turcotte
(919) 771-6366

November TBD

PROGRAM SCHEDULE:

November Elections

Remember, the club will reimburse you for up to \$85 (bring your receipts to the treasurer).

November Treasurer's Report

Sep. Ending /	
Oct. Beginning Balance	\$12,762.32

Deposits (+)	
Members	\$121.50

Sub total	\$121.50

Checks Written (-)	
Newsletter	\$85.37
Food for Meeting	69.07

Sub Total	\$154.44

Oct. Ending /	
Nov. Beginning Balance	\$12,729.38

December Birthdays

- Anthony Andreali
- Carolyn Beck
- Judy Fersch
- Karen Glaser
- Obsidian Harris
- Jack Jin
- Janet Jones
- Steven Nohren
- John Nohren
- Claudia Sieminski

November B-Day Members

- Michele Beach
- Pat Bost
- Daniel Cathey
- Kelsey Cox
- Steve Glaser
- Judy Heinz
- Jerry Miller
- Debbie Miller
- Lisa Sullivan
- Kristi Viles
- Joshua Whitfield
- Wade Wilson



Membership applications may be mailed to:

Tar Heel Gem & Mineral Club, Inc.
Attention: Treasurer
10609 Chelsea Drive
Raleigh, NC 27603

Tar Heel Gem and Mineral Club, Inc. - September Meeting Minutes

Tuesday, October 17, 2017

Attendees = 27

Opening of Club Meeting:

Melissa opened the meeting at 8:00pm.

New members - 4

Program:

Grab Bags, polished stones not available, so bags are not stapled.

Old Business:

Show for AmFed April 6, 7, 8, 2018 – hotels almost firmed up. Table display (facet structure) in progress. Display cases to be judged.

Membership name tag mineral ID – winner was Michelle Strange with the ID as Cinnabar. She chose some faceting rough.

New Business:

Herkimer Diamond gift shop and offices destroyed in fire – in Herkimer, NY

Nominations for new officers for 2018: Linda Searcy – President, VP – ?, Treasurer - Corinne, Secretary - Lindsey Brancher (sp), Member-At-Large – George, Bob, Melissa

Refreshments:

Linda Searcy

Door Prize:

Winner: Katherine Cherry, Ammonite in Matrix



Close of Meeting:

Meeting ended 9:30pm.

Respectfully Submitted

Linda Searcy,

Secretary, Tar Heel Gem and Mineral Club, Inc.

Prez Sez

Continued from Page 1

and the enthusiasm from our 'big kids' during speaker presentations and field trips shows me we have something special! I look forward to what the New Year will bring for the club. I hope all of you have a wonderful and safe holiday season!

Warm Wishes,
Melissa Whitfield
President
Tar Heel Gem and Mineral Club, Inc.

Newly Discovered Volcanic Rock Minerals May Offer New Insights Into Earth's Evolution

Continued from Page 1

The basic research came from more than three decades of LSU scientists studying and mapping the Barberton Mountains of South Africa. The research team, including LSU geology professors Gary Byerly and Huiming Bao, geology PhD graduate Keena Kareem, and LSU researcher Benjamin Byerly, conducted chemical analyses of hundreds of komatiite rocks sampled from about 10 lava flows.

"Early workers had mapped large areas incorrectly by assuming they were correlatives to the much more famous Komati Formation in the southern part of the mountains. We recognized this error and began a detailed study of the rocks to prove our mapping-based interpretations," said Gary Byerly.

Within the rocks, they discovered original minerals called fresh olivine, which had been preserved in remarkable detail. Though the mineral is rarely found in rocks subjected to metamorphism and surface weathering, olivine is the major constituent of Earth's upper mantle and controls the nature of volcanism and tectonism of the planet. Using compositions of these fresh minerals, the researchers had previously concluded that these were the hottest lavas to ever erupt on Earth's surface with temperatures near 1600 degrees centigrade, which is roughly 400 degrees hotter than modern eruptions in Hawaii.

"Discovering fresh unaltered olivine in these ancient lavas was a remarkable find. The field work was wonderfully productive and we were eager to return to the lab to use the chemistry of these preserved olivine crystals to reveal clues of the Archean Mantle," said Kareem

The researchers suggest that maybe a chunk of early-Earth magma ocean is preserved in the approximately 3.2 billion year-old minerals.

"The modern Earth shows little or no evidence of this early magma ocean because convection of the mantle has largely homogenized the layering produced in the magma ocean. Oxygen isotopes in these fresh olivines support the existence of ancient chunks of the frozen magma ocean. Rocks like this are very rare and scientifically valuable. An obvious next step was to do oxygen isotopes," said Byerly.

This study grew out of work taking place in LSU's laboratory for the study of oxygen isotopes, a world-class facility that attracts scientists from the U.S. and international institutions for collaborative work. The results of the study

were so unusual that it required extra care to be certain of the results. Huiming Bao, who is also the head of LSU's oxygen isotopes lab, said that the team triple and quadruple checked the data by running with different reference minerals and by calibrating with other independent labs.

"We attempted to reconcile the findings with some of the conventional explanations for lavas with oxygen isotope compositions like these, but nothing could fully explain all of the observations. It became apparent that these rocks preserve signatures of processes that occurred over four billion years ago and that are still not completely understood," said Benjamin Byerly.

Oxygen isotopes are measured by the conversion of rock or minerals into a gas and measuring the ratios of oxygen with the different masses of 16, 17, and 18. A variety of processes fractionate oxygen on Earth and in the Solar System, including atmospheric, hydrospheric, biological, and high temperature and pressure.

"Different planets in our solar system have different oxygen isotope ratios. On Earth this is modified by surface atmosphere and hydrosphere, so variations could be due either to heterogeneous mantle (original accumulation of planetary debris or remnants of magma ocean) or surface processes," said Byerly. "Either might be interesting to study. The latter because it would also provide information about the early surface temperature of Earth and early origins of life."

This work was supported by a National Science Foundation grant awarded to Byerly, a NASA grant awarded to Bao, and general support from LSU.

Journal Reference:

Benjamin L. Byerly, Keena Kareem, Huiming Bao, Gary R. Byerly. **Early Earth mantle heterogeneity revealed by light oxygen isotopes of Archean komatiites.** *Nature Geoscience*, 2017; 10 (11): 871 DOI: [10.1038/ngeo3054](https://doi.org/10.1038/ngeo3054)

Louisiana State University. "Newly discovered volcanic rock minerals may offer new insights into earth's evolution." ScienceDaily. ScienceDaily, 2 November 2017. <www.sciencedaily.com/releases/2017/11/171102180327.htm>.

Magma Held In 'Cold Storage' Before Giant Volcano Eruption

By University of Wisconsin-Madison

Long Valley, California, has long defined the "super-eruption." About 765,000 years ago, a pool of molten rock exploded into the sky. Within one nightmarish week, 760 cubic kilometers of lava and ash spewed out in the kind of volcanic cataclysm we hope never to witness.



A new study looks at rock from the titanic eruption that formed Long Valley Caldera in California 765,000 years ago. Calderas occur when a volcano collapses after an eruption. Long Valley has been studied by Wes Hildreth (in background), an author of the new PNAS study, for decades. The study signals that we don't fully understand these giant eruptions.

Credit: U.S. Geological Survey

The ash likely cooled the planet by shielding the sun, before settling across the western half of North America.

Here's a rule of geoscience: The past heralds the future. So it's not just morbid curiosity that attracts geoscientists to places like Long Valley. It's an ardent desire to understand why super-eruptions happen, ultimately to understand where and when they are likely to occur again.

This week (Nov. 6, 2017), in the *Proceedings of the National Academy of Sciences*, a report shows that the giant body of magma -- molten rock -- at Long Valley was much cooler before the eruption than previously thought.

"The older view is that there's a long period with a big tank of molten rock in the crust," says first author Nathan Andersen, who recently graduated from the University of Wisconsin-Madison with a Ph.D. in geoscience. "But that idea is falling out of favor.

"A new view is that magma is stored for a long period in a state that is locked, cool, crystalline, and unable to produce an eruption. That dormant system would need a huge infusion of heat to erupt."

It's hard to understand how the rock could be heated from an estimated 400 degrees Celsius to the 700 to 850 degrees needed to erupt, but the main cause must be a quick rise of much hotter rock from deep below.

Instead of a long-lasting pool of molten rock, the crystals from solidified rock were incorporated shortly before the eruption, Andersen says. So the molten conditions likely lasted only a few decades, at most a few centuries. "Basically, the picture has evolved from the 'big tank' view to the 'mush' view, and now we

propose that there is an underappreciation of the contribution of the truly cold, solidified rock."

The new results are rooted in a detailed analysis of argon isotopes in crystals from the Bishop Tuff -- the high-volume rock released when the Long Valley Caldera formed. Argon, produced by the radioactive decay of potassium, quickly escapes from hot crystals, so if the magma body that contained these crystals was uniformly hot before eruption, argon would not accumulate, and the dates for all 49 crystals should be the same.

And yet, using a new, high-precision mass spectrometer in the Geochronology Lab at UW-Madison, the research group's dates spanned a 16,000 year range, indicating the presence of some argon that formed long before the eruption. That points to unexpectedly cool conditions before the giant eruption.

Better tools make better science, Andersen says. "The new instrument is more sensitive than its predecessors, so it can measure a smaller volume of gas with higher precision. When we looked in greater detail at single crystals, it became clear some must have been derived from magma that had completely solidified -- transitioned from a mush to a rock."

"Nathan found that about half of the crystals began to crystallize a few thousand years before the eruption, indicating cooler conditions," says Brad Singer, a professor of geoscience at UW-Madison and director of the Geochronology Lab. "To get the true eruption age, you need to see the dispersion of dates. The youngest crystals show the date of eruption."

The results have meaning beyond volcanology, however, as ash from Long Valley and other giant eruptions is commonly used for dating.

"These huge eruptions deposit ash all over the place, and that lets you make correlations in the rock record to aid geologic, biologic and climatic studies across the continent," says Andersen. "This blanket of ash anchors you in time. The closer we can pin down the eruption age, the better we can study all facets of Earth's history."

"It's controversial, but finding these older crystals means that part of this large magma body was very cool immediately prior to eruption," says Singer, a volcanologist who was Andersen's UW advisor. "This flies in the face of a lot of thermodynamics."

A better understanding of the pre-eruption process could lead to better volcano forecasting -- a highly useful but difficult proposition at present.

"This does not point to prediction in any concrete way," says Singer, "but it does point to the fact that we don't understand what is going on in these systems, in the period of 10 to 1,000 years that precedes a large eruption."

Journal Reference:

Nathan L. Andersen, Brian R. Jicha, Brad S. Singer, Wes Hildreth. **Incremental heating of Bishop Tuff sanidine reveals preeruptive radiogenic Ar and rapid remobilization from cold storage.** *Proceedings of the National Academy of Sciences*, 2017; 201709581 DOI: [10.1073/pnas.1709581114](https://doi.org/10.1073/pnas.1709581114)

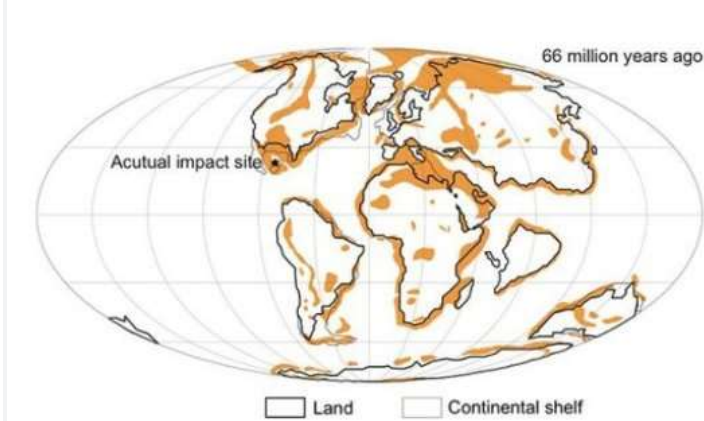
University of Wisconsin-Madison. "Cool idea: Magma held in 'cold storage' before giant volcano eruption." ScienceDaily. ScienceDaily, 6 November 2017.

www.sciencedaily.com/releases/2017/11/171106152256.htm.

Site Of Asteroid Impact Changed The History Of Life

By Tohoku University

An asteroid, also known as the Chicxulub Impactor, hit Earth some 66 million years ago, causing a crater 180 km wide. The impact of the asteroid heated organic matter in rocks and ejected it into the atmosphere, forming soot in the stratosphere.



Mass extinction only occurred when the asteroid having 9-km diameter hit the orange areas.

Credit: Kunio Kaiho

Soot is a strong, light-absorbing aerosol that caused global climate changes that triggered the mass extinction of dinosaurs, ammonites, and other animals, and led to the macroevolution of mammals and the appearance of humans.

Based on results of a new study, the researchers say that the probability of the mass-extinction occurring was only 13 percent. This is because the catastrophic chain of events could only have occurred if the asteroid had hit the hydrocarbon-rich areas occupying approximately 13 percent of Earth's surface.

Led by Tohoku University Professor Kunio Kaiho, the researchers came by their hypothesis by calculating the amount of soot in the stratosphere and estimating climate changes caused by soot using a global climate model developed at the Meteorological Research Institute. The results are significant because they explain the pattern of extinction and survival.

During the study, Kaiho thought that the amount of soot and temperature anomaly might have been affected by the amount of sedimentary organic-matter. So, he analyzed the amount of sedimentary organic-matter in Earth to obtain readings of temperature anomaly caused by soot in the stratosphere.

Naga Oshima of the Meteorological Research Institute conducted the global climate model calculations to obtain temperature anomalies caused by various amounts of soot injected into the stratosphere.

Kaiho clarified the relationship between the findings and concluded that the significant cooling and mass-extinction event could have only have occurred if the asteroid had hit hydrocarbon-rich areas occupying approximately 13 percent of Earth's surface.

If the asteroid had hit a low-medium hydrocarbon area on Earth (occupying approximately 87 percent of Earth's surface), mass extinction could not have occurred and the Mesozoic biota could have persisted beyond the Cretaceous/Paleogene boundary.

The site of the asteroid impact, therefore, changed the history of life on Earth.

According to the study, soot from hydrocarbon-rich areas caused global cooling of 8-11°C and cooling on land of 13-17°C. It also caused a decrease in precipitation by approximately 70-85 percent on land and a decrease of approximately 5-7°C in seawater temperature at a 50-m water depth, leading to mass extinction of life forms including dinosaurs and ammonites.

At the time, these hydrocarbon-rich areas were marine coastal margins, where the productivity of marine algae was generally high and sedimentary rocks were thickly deposited. Therefore, these areas contained a high amount of organic matter, part of which became soot from the heat of the asteroid's impact.

Thus, the researchers concluded that the Chicxulub impact occurred in a hydrocarbon-rich area and is a rare case of mass extinction being caused at such an impact site.

Kaiho and Oshima are doing further studies to clarify the frequency of all the cooling events by impacts. Kaiho's team is analyzing climate change caused by large volcanic eruptions that may have contributed to other mass extinctions. It is hoped that the results will lead to further understanding of the processes behind those mass extinctions.

Journal Reference:

Kunio Kaiho, Naga Oshima. **Site of asteroid impact changed the history of life on Earth: the low probability of mass extinction.** *Scientific Reports*, November 2017
DOI: [10.1038/s41598-017-141990-x](https://doi.org/10.1038/s41598-017-141990-x)

Tohoku University. "Site of asteroid impact changed the history of life." ScienceDaily. ScienceDaily, 10 November 2017.

<www.sciencedaily.com/releases/2017/11/171110113950.htm>.

Items For Auction!

We have some items for auction! Joe Moylan, John Heinz and Corinne checked out and picked up these items on Friday. Cyndy picked out the grab bag (little stuff) over the week end. Here is what we have 3 different drum tumblers and one Ray Tilt Gem Maker Flat Laps. We have Petrified

wood and 2 pieces good stuff to cut. We will have some minimum prices on this stuff.

Corinne Hummel
Tar Heel Gem and Mineral Club, Inc.

UPCOMING SHOWS

April 6 - 8, 2018: Raleigh, NC – 42nd Annual Capital Area Gem & Mineral Show. Tar Heel Gem and Mineral Club, Inc. Kerr Scott Building, NC State Fairgrounds, Raleigh, NC. The show is sponsored by the Tar Heel Gem & Mineral Club and includes 29 dealers. The Hospitality area sells grab bags with mineral specimens. Buy a rock at the Geode booth and be the first to see what is inside. The on-going Silent Auction has new items every hour. Dealers provide minerals, fossils, finished jewelry, gemstones, findings and beads for sale.. Hours: Fri 3-8; Sat 10-6; Sun 10-5. Admission: Free and Free Parking. Contact: Cyndy Hummel; 919-779-6220; mchummel@mindspring.com; www.tarheelclub.org;

November 24 - 26, 2017: Salem, Va - Roanoke Valley Mineral and Gem Society 38th Annual Gem and Mineral Show. Salem Civic Center, 1001 Roanoke Blvd., Salem, Va. 24153. Hours: Nov 24th 2pm-7pm; Nov 25th 10am-6pm; Nov 26th Noon-5pm; ADMISSION: Three day admission ticket price \$5; Children aged 14 and under FREE. FOOD DRIVE to benefit the Salem/Roanoke County Food Pantry. Panning Sluice, Fluorescent Mineral Display, Kindness Rocks Project, Geode Sales, DOOR PRIZES, Videos and more! Contact Carol Messimer, ckwlt@aol.com

November 17 - 19, 2017: Columbia, SC - The Columbia Gem & Mineral Society will hold its 50th Annual Gem, Mineral, & Jewelry Show. Hours: Fri. Nov. 17, 10:00 - 6:00; Sat. Nov. 18, 10:00 - 6:00; Sun. Nov. 19, 11:00 - 5:00; Address: Jamil Temple, 206 Jamil Rd., Columbia, SC 29210. Admission: \$5.00 for adults, Sixteen & under free with adult. All military & their dependents free. Jewelry, beads, loose stones, fossils, minerals, gold, silver, & tools for sale. Geodes sold & cut. Club member's rock collections on exhibit & lapidary demonstrations. Lots of fun for the whole family. South Carolina amethyst on display. Sponsored by The Columbia Gem & Mineral Society. Contact: Sue Shrader 803-736-9317; ashrader@mindspring.com; Dealers; Sharon Sterrett 803-356-1472; ssterrett@sc.rr.com; www.cgams.org

Vugsites

The following are some links to Web-Sites that may interest some of our members:

<http://www.tarheelclub.org> / <https://www.facebook.com/tarheelgemandmineralclub/> These are the official sites for the Tar Heel Gem & Mineral Club. I would strongly urge all members to check them out on a regular basis.

<http://www.amfed.org> / <http://www.amfed.org/sfms> These are the official sites for the organizing body that the Tar Heel Gem & Mineral Club is founded under. I would strongly urge all members to check them out on a regular basis.

http://www.amfed.org/sfms/lodestar_newsletter.html The SFMS Lodestar Newsletter

<http://www.carolinageologicalsociety.org/CGS/Home.html> This site provides numerous downloadable field-trip guide books, maps, and charts of the Carolinas. It will prove to keep any avid rock hound busy for years. Great Site!

http://www.ncminerals.com/ncmineralswebsite_files/page0011.htm And while we are on the subject, try this link. Its titled: Links of Interest to Rock hounds in NC. It will take you to a list of links for North Carolina gems and minerals.

<http://www.rocksforkids.com/> Just like the name says, a nice place to steer the younger members.

Information & photographs of over 6300 specimens from the Glenn & Martha Vargas Gem & Mineral Collection.

<http://www.rockhoundlounge.com> Scott Laborde, a club member maintains his own web site that might be of interest to people collecting in and around Wake County.

http://www.msnbc.msn.com/id/29726500/ns/technology_and_science-science This site highlights a half dozen of the most recent significant fossil finds.

<http://appmodo.com/13971/mole-quest-for-the-terracore-gem-app-review-for-the-iphone-and-ipod-touch/> If you have an iphone or an ipod touch, this rock-hounding may be the game for you.

http://diamonddanpublications.net/index_files/page0009.html Diamond Dan's Mini Miner's Monthly

I would like to encourage all members of the THG&MC that maintain their own presence on the internet to send me a link to their site to be published in future Vugsites so that other club members may learn and enjoy the craft, the art, the interests that many of us have in common.

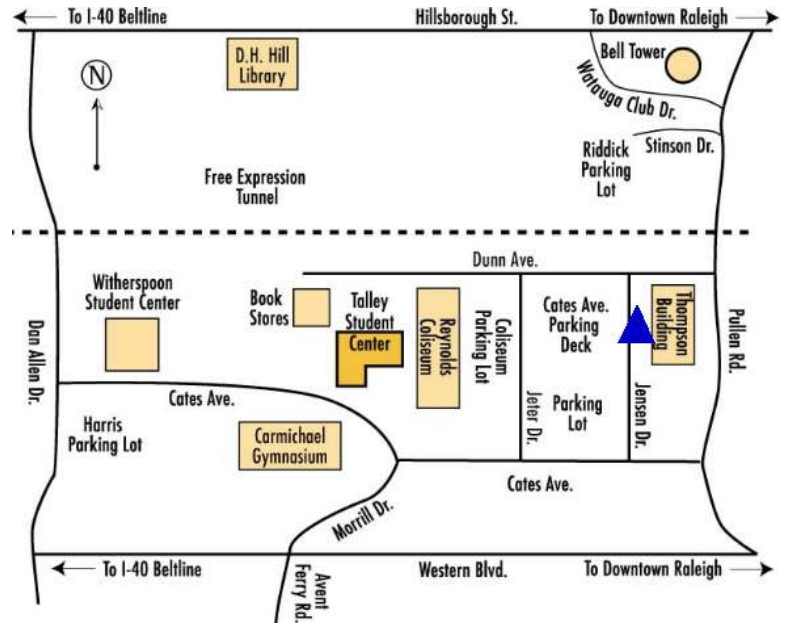
Park in the Cates Ave. Parking Deck off Jensen Dr. Enter Thompson Building directly across from the parking lot.

**Our Next Meeting is
November 21, 2017 @ 7:30PM
Thompson Building / NCSU Campus.**

About Our Organization...

The Tar Heel Gem and Mineral Club, Inc. was formed in 1974 as a nonprofit educational organization for people who enjoy the lapidary arts, earth sciences, and related subjects. The main objectives of the club are to investigate, preserve, and share knowledge of rocks, minerals, and precious stones, and to promote interest in mineralogy, paleontology, earth sciences, and lapidary techniques, among club members and among the general public. The club pursues these goals through publications, meetings, lectures, field trips, exhibits, demonstrations, and other activities.

Come and be a part of the Fun!



TAR HEEL GEM & MINERAL CLUB
10609 Chelsea Drive
Raleigh, NC 27603

