OPINION PAGES

Quotes OF THE WEEK

"I'm a hawk – but I'm a cheap hawk. I believe we should reduce the Pentagon to a triangle."

House Speaker Newt Gingrich, in his speech supporting 2nd district congressional nominee Lee Terry

"Students are the ones that pour their hearts into the campaign. We love our volunteers."

Kristi Klein, volunteer coordinator for gubernatorial candidate Bill Hoppner, on student support

"Working together was the key to recovery."

Mayor Mike Johanns, looking back on the one-year anniversary of the October 1997 blizzard

"We get zero percent student fees, zero percent institutional funding. That's nothing."

NU Athletic Director Bill Byrne, on where the athletic department gets its funding

"We just can't monitor every time somebody passes gas, but we want to remain vigilant (about conduct)."

Alpha Tau Omega Fraternity alumni board member Rob Otte, on the arrest of an ATO member for making fake IDs for minors.

"While the adjectives strange, weird, graphic, unnecessary, distasteful, indecent and offensive are applicable to Harrold's video, it is not legally obscene."

Judge Richard Sievers, in the ruling that dismissed the charges against Scott Harrold

"We're angry. We lost. If you're a winner, you don't accept losing at all. That was a team we could have beat and probably should have beat, but offensively, we lost the game."

MU running back Devin West, on the results of the NU-MU game

"With four seconds left I turned to their huddle and asked them if they remembered anything like this."

NU rush end Chad Kelsay, on the similarities of this year's NU-MU game to last year's

"The vintage instruments have a lot to do with our sound."

John Helwick, Radio King's vocalist, on how the band stays true its style

"The real question is what the audience is going to think, and I hope they like this and maybe go away thinking that opera isn't just for older people and serious stuff – that opera can be a lot of fun."

Professor Randall Snyder, on his one-act comic opera, "Divine Madness"

"Personally, I feel like I can go out there and lead this team, whether it be starting or just coming into whatever role it is."

Senior NU quarterback Monte Christo on his role on the team

Mook's VIEW

No milky center

Great Annihilator reigns at heart of galaxy

AARON COOPER is a senior English major and a Daily Nebraskan columnist.

For years, we have spent immeasurable amounts of time and money in hopes of answering the question of whether or not life exists on other planets or within other galaxies.

Underneath our fascination with the possibility of life outside our world, a separate galactic mission has existed with a fraction of the publicity: the attempt to determine what lies at the center of the Milky Way.

For a long time, scientists could not discern the nature of the center because of vast, dense clouds of dust and hundreds of millions of stars concentrated in and around the core, blocking the view.

Among one trillion photons of visible light aimed toward a telescope on Earth, only one will make it. If the sun's light was filtered in this manner, it would not be visible to the naked eye.

As early as the 1930s, scientists discovered that photons of much lower frequency cannot be as easily blocked by dust. They began detecting a hiss and cackle of apparently dense stores of hydrogen and other elements present in the center of the Milky Way.

In the 1950s, they distinguished an abnormally powerful source of radio noise within the center. It became known as Sagittarius A since the noise comes from the direction of the constellation of Sagittarius, and scientists thought it might be the remains of a supernova, a star that had exploded.

If so, that would make it hard to support the previous idea of a dormant and seemingly uninteresting core.

Scientists were even more fascinated that much of the central energy was coming from an even narrower region within Sgr A which was named Sgr A* (or the "A star").

It wasn't until 1997 that astronomers finally reached a consensus on the makeup of Sgr A*, thanks to research conducted by two independent groups of investigators.

Andrea Ghez led one of the groups from UCLA in this crucial research. For five years, she ventured annually to Mauna Kea, Hawaii, for the use of a telescope allowing the clearest view on Earth of Sgr A*.

She helped develop a technique for the needed resolution, 20 times greater than ground-based telescopes and three times greater than the Hubble Space Telescope, which involved taking a rapid series of snapshots that could be averaged to cancel out distorting effects caused by our atmosphere.

This led to the determination that the closer the stars were to the very center of the galaxy, the faster they orbited, up to 900 miles per second.

Whatever was keeping stars in an orbit that fast had to have the mass of 2.5 million suns, all packed into a density at least a trillion times that of its galactic outer regions.

Only one scientific entity harbors those specifications and adheres to those laws of physics.

A black hole.

Sgr A* became known as the Great Annihilator. It crams the entirety of its multimillion-star mass into a space smaller than one atom; infinitely small according to Einstein's general theory of relativity.

Black holes represent a true misfit of science because they spawn the most luminous objects in the universe, which result from a phenomenon known as accretion.

When matter is propelled into the black hole and pulled by the hole's all-powerful gravity, the matter heats up and radiates that heat away as light until it disappears past the "event horizon" – the point beyond which nothing (not even light) can escape the hole's violent gravitational pull.

The Milky Way's Great Annihilator provides for temperatures approaching 10 billion degrees, cataclysmic winds, searing radiation, magnetic fields that roil and squeeze atoms until they shine, and vast fountains of hot gas.

Perhaps the most interesting property of the Great Annihilator is its ability to split a star in half. When a star gets too close to the black hole, the hole's gravity sucks in half the star while the other half careers ahead in its natural high speed orbit.

These immense discoveries have led scientists to debate over the specific classification of the Milky Way. The most controversial way to categorize galaxies is by the activity displayed by their cores.

Quasars rule supreme as very young and extremely distant galaxies which produce as much light as the entire Milky Way from a core only a millionth of the Milky Way's diameter.

Seyfert galaxies are next in line as forms of miniquasars. They produce a great deal of radiation from their core that is less than a quasar's but still spectacular by general standards.

After that, *starburst* galaxies come into the picture. These galaxies harness a brilliant stream of light produced by the rapid burning and eventual explosive death of millions of massive young stars.

The Milky Way previously has fallen into a fourth and unnamed category of galaxies that have no known immensely radiating core or swarm of superheated stellar studs packed tightly into the center.

For a galaxy harnessing a core such as the Great Annihilator, the ensuing emissions of light should be 100,000 times as bright as they are, according to Boston University astronomer John Mattox. This, he says, essentially keeps the Milky Way from being classified as a starburst galaxy.

Other scientists concede this and theorize that the Milky Way may once have resembled a starburst galaxy, but now it does not possess the brilliant supernova activity typical of starburst galaxies and perhaps may again some time in the distant future.

You'd think with a name like the "Great Annihilator" the Milky Way would merit a step up in galactic standards.

Harvard astrophysicist Ramesh Narayan has developed a theory based on the idea that matter pulled toward a black hole radiates away its heat only when the particles composing the matter have a chance to interact with one another, thus allowing radiating photons to be coaxed from particles by other particles to be emitted as light.

If the particles don't come close enough to each other, they won't entice one another to release the photons and therefore won't radiate as much, thus explaining the inhibitory nature of the Great Annihilator.

Cooper's Law: *Every truth about the universe is relative. When we can't find any "right" answers, we must pursue the best ones.*

It seems evident that solving this mystery surrounding our "ordinary" galaxy is far from over, but the journey has been taken much further than ever before.

Now we know that the center of the Milky Way is not a vat of nothingness hiding behind clouds of dust and millions of stars. It is a black hole, one of the most mysterious scientific phenomena known to humans.