

REACHING FOR A STAR. MY SUPERNOVA SEARCH ADVENTURE

Doug RICH¹

Key words: supernova, supernova 2003O, supernova 2005ay.

It all began a long time ago when I was a boy. My father bought me a small telescope. It wasn't a very powerful telescope but nevertheless, it got me interested in astronomy. It planted a seed. By the time my wife and I moved from Connecticut, (near New York) to Hampden, Maine (close to Eastern Canada), around 25 years ago, I owned four telescopes and had a variable star observing program. I had become an avid amateur astronomer.

Now, the most rewarding thing an amateur astronomer could ever hope to accomplish would be to make some kind of astronomical discovery – maybe this could be a comet, a nova, or even a supernova. What are the chances of this happening? Unlikely! I never gave it a second thought until one morning, while eating breakfast; I read an article about an amateur from Australia who was discovering supernovas. For some reason, the idea of finding exploding stars in distant galaxies piqued my interest. A voice in the back of my head said “you can do this too”. Shortly after reading this article, I started a visual search program for supernovas. It was January 1991.

A supernova is the explosive death of a star. Most fall into one of two categories. The first type is a white dwarf that explodes after taking material from a companion star. This mass accretion triggers a thermal nuclear runaway of carbon and oxygen - a type Ia supernova event. The second more common type involves the core-collapse of a very massive star and subsequent explosion of the star. This type is often called a type II. The three things that all supernovas have in common: they are rare, they are very luminous, and they are found in galaxies – mostly in spiral galaxies. So, the more galaxies you observe, the better your chances are of finding one. I knew this.

My search program started out very simple and relaxed. On clear nights I would carry out to the backyard either my 10 inch (25 cm) Newtonian reflector or the big 16 inch (40 cm). One by one I'd observe the spiral galaxies on my list using different eyepieces and reference charts. While quietly observing, my ears would be tuned in to the music of the night world – the high-pitched singing of coyotes in the spring, crickets and peeper frogs during the summer, the hooting of barred owls in the fall; winters were quiet and cold. After a while, I really looked forward to these nightly escapes to the backyard, alone with the stars and my nocturnal friends. And what more could I ask for? I had the beautiful night sky, a peaceful connection with nature, I was doing real science – I had everything it seemed – everything that is except a supernova discovery.

After several years of visual searching without success I realized that if I really wanted to find a supernova I would have to change my strategy; I would have to go “high-tech”.

I bought a digital CCD camera and attached it to a Meade 10 inch (25 cm) computerized Schmidt-Cassegrain telescope. For convenience sake and also to keep the telescope polar-aligned, I built an observatory. I began this “electronic search” in the summer of 1999. The electronic search allowed me to look deeper into space and increase the number of galaxies surveyed.

At this point I think something in me had changed. I went from simply *wanting* to find a supernova to becoming absolutely *obsessed*. Every clear night I was taking galaxy images. If I had plans or a social function scheduled for particular night and that night turned out to be clear (no clouds), the event was either cancelled or postponed. I missed dinner engagements, movies, parties; I even skipped astronomy club meetings. Every effort was made to take more galaxy pictures on clear nights.

Finally, on a cold January evening in 2003, and after taking more than 10,000 galaxy images, I discovered a new supernova! This supernova turned out to be a faint type II in distant

¹ Amateur astronomer - Hampden USA <http://www.richobservatory.com>

galaxy UGC 2798. Supernova 2003O was actually just a tiny speck of light in the picture, but it was one of the brightest moments of my life!

Spring, 2003, I upgraded to a Meade 12 inch (30 cm) telescope and a robotic mount called a "Paramount". In the fall of 2008, I installed a large Meade 16 inch (40 cm) telescope on the robotic mount. Increasing the telescope aperture enabled me to take shorter exposures which resulted in more images. More images = more discoveries.

Recently, I have teamed-up with amateur astronomers from the *Eagle Hill Institute* to search for supernovae. The Eagle Hill Institute is a higher learning institute located near me in Steuben, Maine, USA. The team idea for searching for supernovae makes a lot of sense. When a group examines galaxy images – as opposed to just one person – they are less likely to miss something new. The name of our search program is *The Eagle Hill Supernova Search Project*.

Since 2003, I have averaged a little more than 2 discoveries per year. Each discovery of course is very special. However, I think it was my first supernova - SN2003O - that brought me the most satisfaction and sense of accomplishment. This was the find that got me into the "discovery club".

Image Captions

1. The 10 inch and 16 inch Newtonian telescopes - used for visual search for supernovas during the 1990s.
2. My "tower" observatory attached to my garage.
3. Supernova 2003O in galaxy UGC 2798. This was my first discovery.
4. Galaxy UGC 2798/SN2003O without annotation.
5. Supernova 2005ay in Galaxy NGC 3938 – this was a type II supernova discovered in March 2005. NGC 3938 is relatively close to us at 43 million light years. This discovery was probably my most significant discovery.
6. Galaxy NGC 3938/SN2005ay without annotation.
7. Doug Rich (author) with Meade 12 inch Schmidt-Cassegrain telescope and Paramount robotic mount.
8. The Meade 16 inch telescope. This is the telescope that I now use for supernova search.

ATINGEREA UNEI STELE. AVENTURA MEA ÎN CĂUTAREA DE SUPERNOVE

Cea mai mare satisfacție la care un astronom amator ar putea spera vreodată este să realizeze o descoperire astronomică - poate fi o cometă, o novă, sau chiar o supernovă. Care sunt șansele ca acest lucru să se întâmple? Puține probabil! O supernovă este moartea explozivă a unei stele.

Programul meu de căutare a început foarte simplu și relaxat. În nopțile senine, scoteam în curtea din spate fie reflectorul newtonian de 10 inch (25 cm), fie reflectorul mai mare de 16 inch (40 cm). Una câte una observam galaxiile spiralate de pe lista mea, folosind diferite oculare și diagrame de referință.

După mai mulți ani de căutări vizuale fără succes, mi-am dat seama că, dacă vreau să găsesc o supernovă, va trebui să schimb strategia. Ar trebui să merg "high-tech".

Am cumpărat un aparat foto digital (CCD) și l-am atașat la un telescop Meade de 10 inch (25 cm) Schmidt-Cassegrain. Am început această "căutare electronică" în vara anului 1999.

În cele din urmă, într-o seară rece din ianuarie 2003, după ce am luat mai mult de 10.000 de imagini de galaxii, am descoperit o nouă supernovă! Această supernovă palidă s-a dovedit a fi de tipul al II-lea în galaxia îndepărtată UGC 2798. Supernova 2003O era de fapt doar un fir mic de lumină din imagine, dar a fost unul dintre cele mai strălucite momente din viața mea!

Recent, am făcut echipă cu astronomii amatori în programul nostru de căutare: *The Eagle Hill Supernova Search Project*.

Din 2003 am scos o medie de un pic mai mult de 2 descoperiri pe an. Fiecare descoperire este, desigur, foarte specială. Cu toate acestea, cred că prima mea supernova - SN2003O - a fost cea

care mi-a adus cea mai mare satisfacție și sentimentul de împlinire. Aceasta a fost descoperirea care m-a adus în "clubul descoperitorilor".



1.



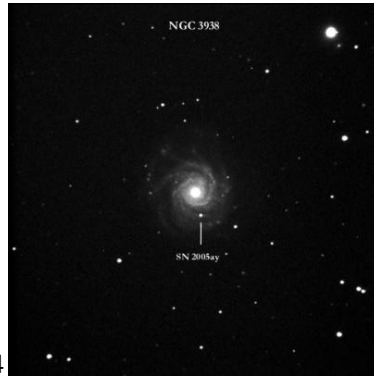
2.



3.



4.



5.



6.



7.



8.

All images were taken by Doug Rich.