Supernova Search

Aaron Rubin- Mechanical Engineer

Email: arubin1@terpmail.umd.edu

Science Discovery and the Universe   **Explore the Universe**

Overview of Project:

The goal of this project was to locate and take pictures of a Supernova. I did so by using a CCD camera connected to one of the telescopes at the UMD Observatory to take pictures of Galaxies.

Explanation:

Once I learned all of the necessary things to start my project I started gathering data. I took pictures of several different galaxies using the CCD camera, and then I compared these original pictures to pictures of the galaxies taken on a different date. If there was a dot of light in a subsequent picture that wasn't there in the original one, then a supernova may have been present.

Goals and Expectations:

My main goal in this Capstone is to locate and take a picture of a galaxy that contains a Supernova, however doing so is very difficult.
I expect to take pictures of various different Galaxies in the hopes that a supernova will appear in one of them.

Results:

Unfortunately, due to technical difficulties and problems with the weather, I was not able to find any Supernovas, but I did learn a lot about the process of finding Supernovas and how to use CCD cameras and telescopes to take pictures of the night sky.

What is a Supernova?

A Supernova is an explosion of a star with a large enough mass at the end of its life cycle and occur every second or so somewhere in the universe. Supernovas can briefly outshine entire galaxies and radiate more energy than the sun will in its entire lifetime!

Source: Space.com
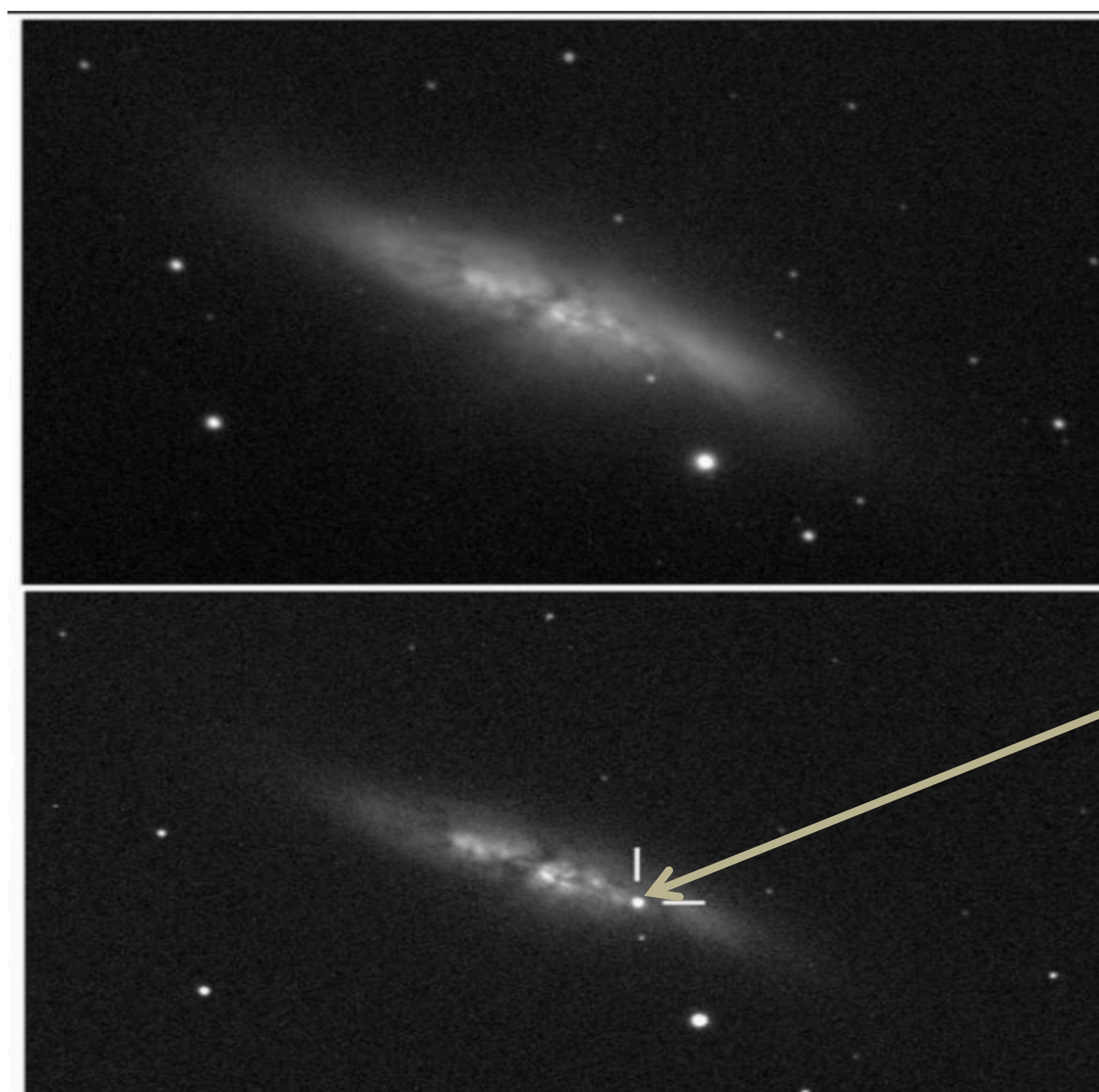
Pictures from students of the University of London Observatory from the M82 galaxy
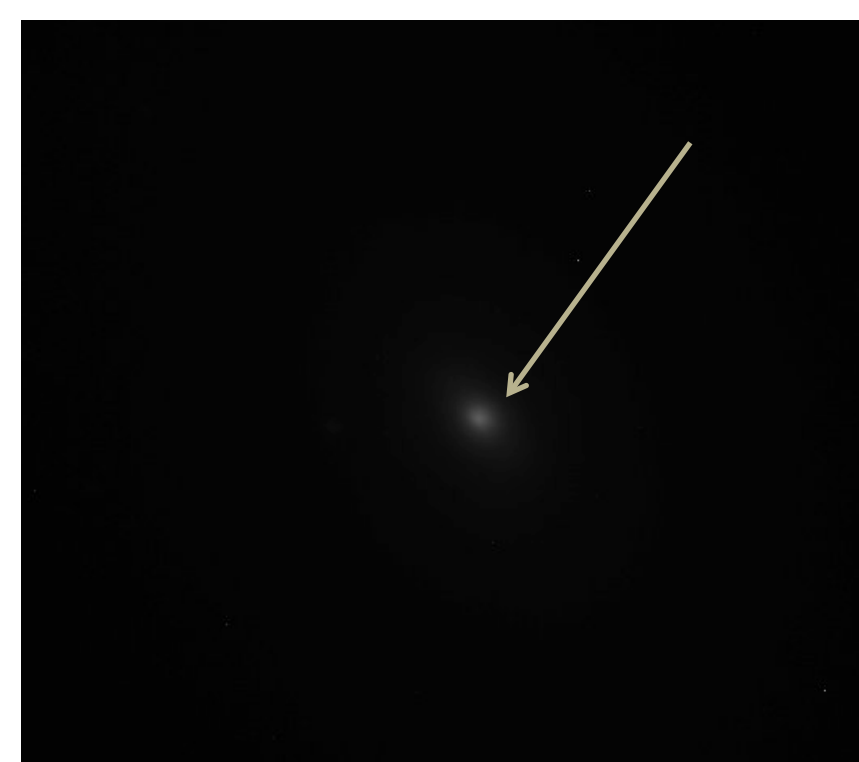
Why Look For Them?

A Supernova can tell scientists a lot about the universe. Supernovas have shown scientists that we live in a constantly expanding universe! Scientists have also found out that Supernovas play a key role in distributing elements throughout the universe!

-Source Nasa.gov
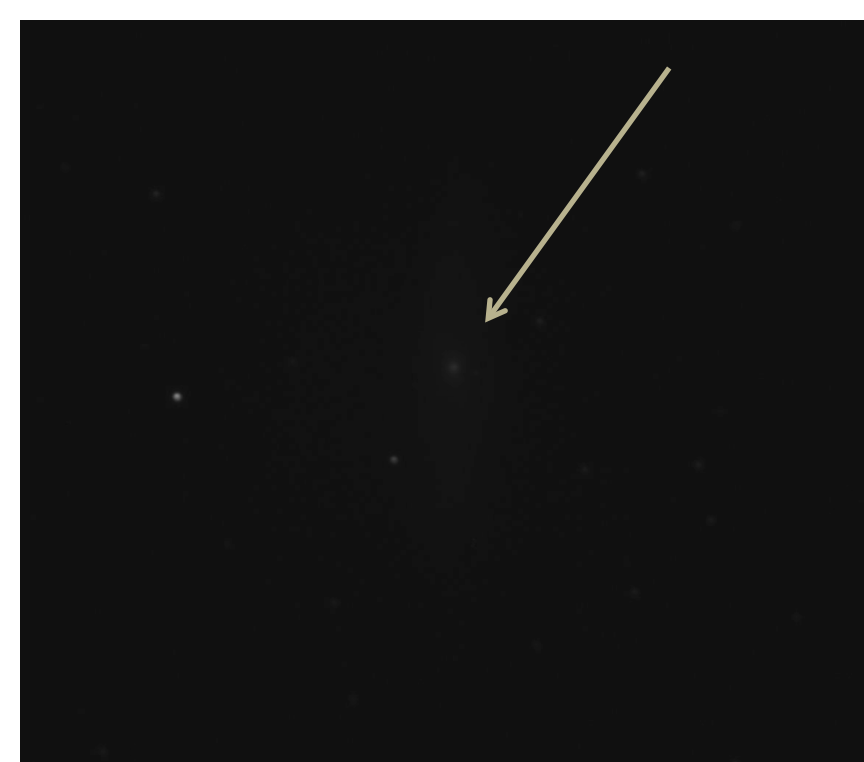
Galaxy M65
−Source Bhumi Kerdsuwan(UMD)

Galaxy M81
−Source UMD Observatory 14in Telescope

I would like to thank Mrs. Warner and the UMD Observatory for all of their help throughout this project. I would not have been able to learn all of the skills necessary for this Capstone without them.

Equipment Used/ Training Needed:

For this project I used the 14" SCT Schmidt-Cassegrain f/10 Telescope and the SBIG ST-8 CCD Camera provided to me by the University of Maryland Observatory.

I needed to learn not only how to operate the telescope, but how to operate the camera and the software we used to gather the data. The first several months of the Capstone was dedicated to becoming comfortable with using all of these things in conjunction with each other.

Observing at night on 14" Telescope

List of Galaxies Searched:

NGC1275	NGC1023
NGC1260	NGC185
NGC694	Abell426
IC469	Andromeda
Virgo Supercluster	

Reflection:

I have learned so much since beginning this project in late September. While I haven't found any Supernovas yet, I still feel like I have accomplished a lot. I have put a lot of time and hours into this Capstone and I feel like this might be something I'd be interested in doing in the future.