



# ADVENTURES WITH **ROSIE & GIBBS** *the lost penguins*



**ADVENTURE 3: AN EXCITING DISCOVERY**

**JULY 2018**



GIBBS, HOW LUCKY ARE WE! LOST AT THE SOUTH POLE, BUT WE MADE IT TO THE PARTY OF THE CENTURY!

I KNOW! AND A SOURCE OF NEUTRINOS ALSO MEANS THE FIRST SOURCE OF COSMIC RAYS. ICECUBERS HAVE HIT IT BIG!

SING WITH ME!

THE POLE, THE POLE, THE POLE IS ON FIRE. FOLLOW THE ALERT, ALERT, ALERT, FOLLOW THE ALERT...

RIGHT, LEFT, RIGHT, LEFT, EVERYBODY, RIGHT, LEFT, RIGHT LEFT...

SO, THIS IS WHAT'S BEHIND ALL THE FUSS?

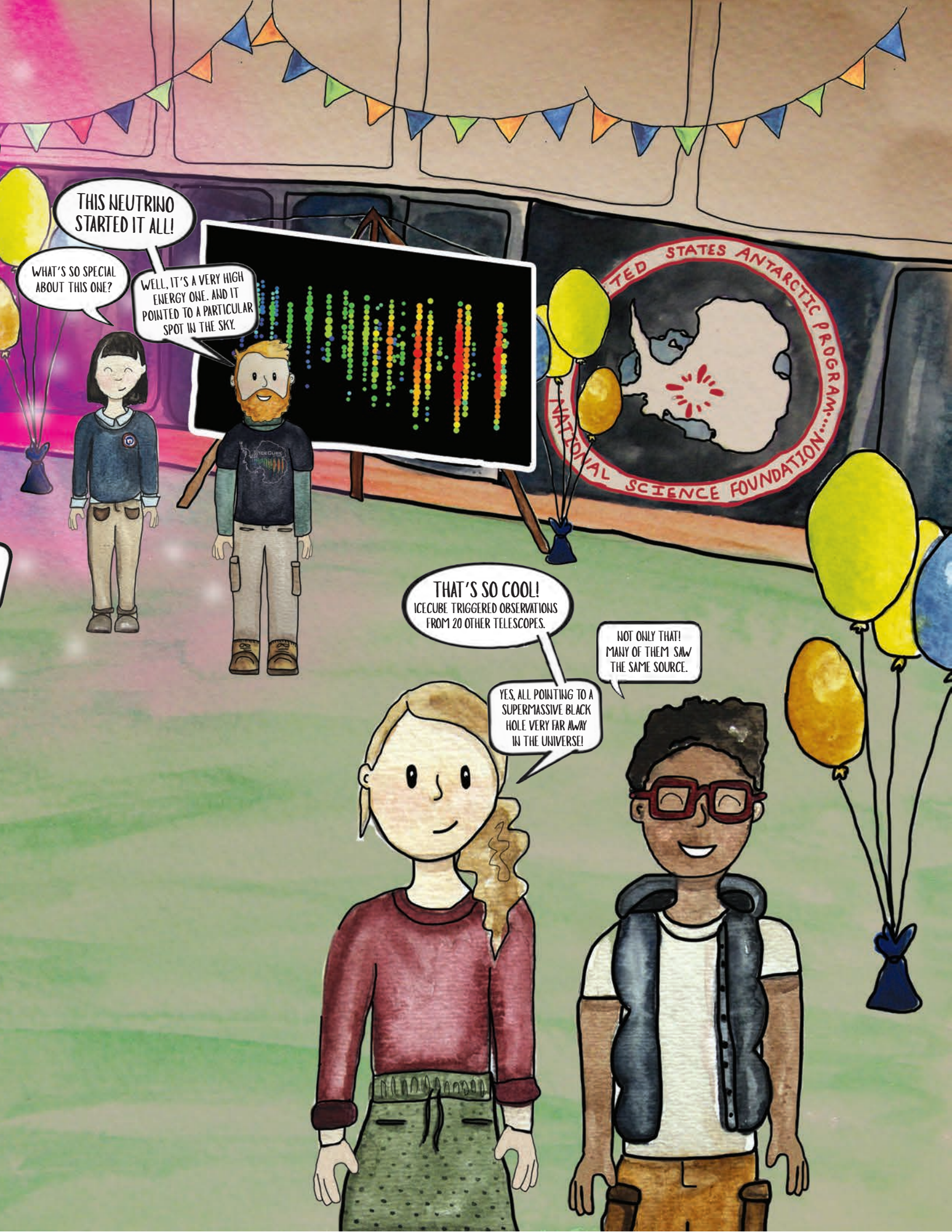
YES, A BLAZAR. ONE LIKE THIS PRODUCED THE NEUTRINOS WE DETECTED.

ISN'T A BLAZAR A BLACK HOLE SPITTING OUT JETS OF PARTICLES?

PRETTY MUCH. BLAZARS ARE EXTREMELY POWERFUL, AND ONE OF THEIR JETS POINTS TOWARD US.



**THE PENGUINS ROSIE AND GIBBS MADE A LONG TRIP FROM ANTARCTICA'S COAST TO THE SOUTH POLE LOOKING FOR ADVENTURES. AND GUESS WHAT... THEY WERE RIGHT ON TIME TO CELEBRATE THE MOST IMPORTANT RESULTS TO DATE FOR THE ICECUBE NEUTRINO OBSERVATORY. UP NORTH, THE ASTROPHYSICS COMMUNITY WAS CELEBRATING A NEW BREAKTHROUGH IN MULTIMESSENGER ASTRONOMY. AND THE SOUTH POLE WINTER CREW DECIDED TO JOIN THE PARTY!**



THIS NEUTRINO STARTED IT ALL!

WHAT'S SO SPECIAL ABOUT THIS ONE?

WELL, IT'S A VERY HIGH ENERGY ONE. AND IT POINTED TO A PARTICULAR SPOT IN THE SKY.

THAT'S SO COOL!  
ICECUBE TRIGGERED OBSERVATIONS FROM 20 OTHER TELESCOPES.

NOT ONLY THAT!  
MANY OF THEM SAW THE SAME SOURCE.

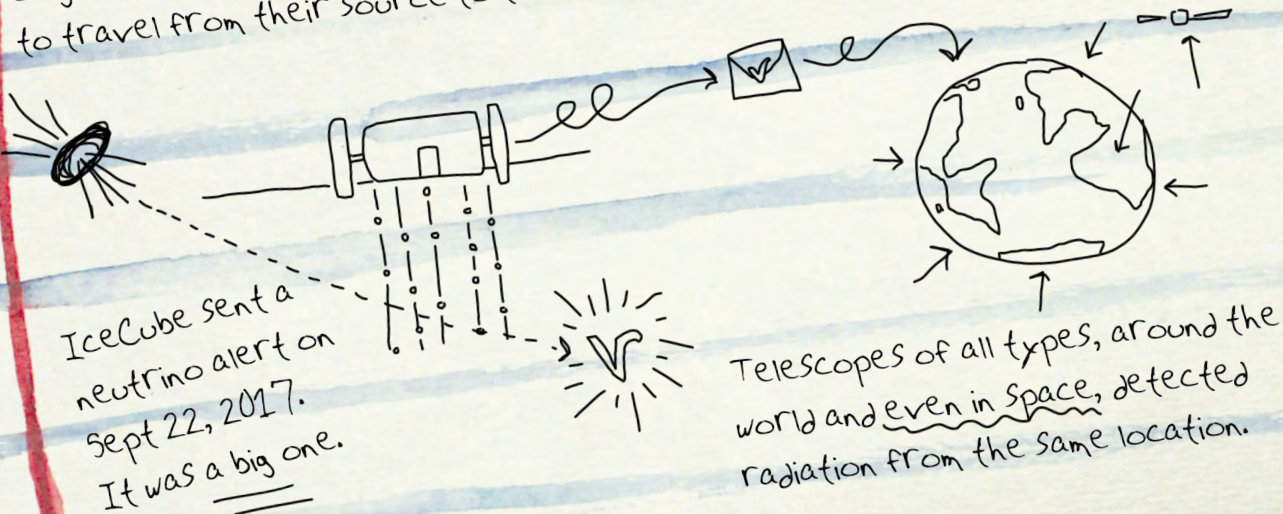
YES, ALL POINTING TO A SUPERMASSIVE BLACK HOLE VERY FAR AWAY IN THE UNIVERSE!

# Rosie's Discoveries

A multimessenger astronomy discovery (or is it a neutrino discovery?)

This was such a fun day that I am not sure where to start!

Here is what happened. We have found that a supermassive black hole is the origin of some neutrinos detected by IceCube. It took them about 4 billion years to travel from their source to the South Pole. It's mind-blowing!



It turns out that we knew this source! It's a blazar, or a black hole spitting out high-energy jets of particles along its axis. We had never seen neutrinos from a specific source before. Was this first neutrino the only one? No, IceCube found over a dozen more neutrinos from using that alert as a pointer. And here we are! Learning more about the discovery with IceCube's winterovers!

Is this neutrino astronomy? Or is this multimessenger astronomy? I'd say it's both! And it may happen again soon! I need to talk to Gibbs. I'm not going back home to Antarctica's coast until the next exciting neutrino shows up.