



NATIONAL  
OPTICAL  
ASTRONOMY  
OBSERVATORY

\$2.50 US  
AAS Meeting

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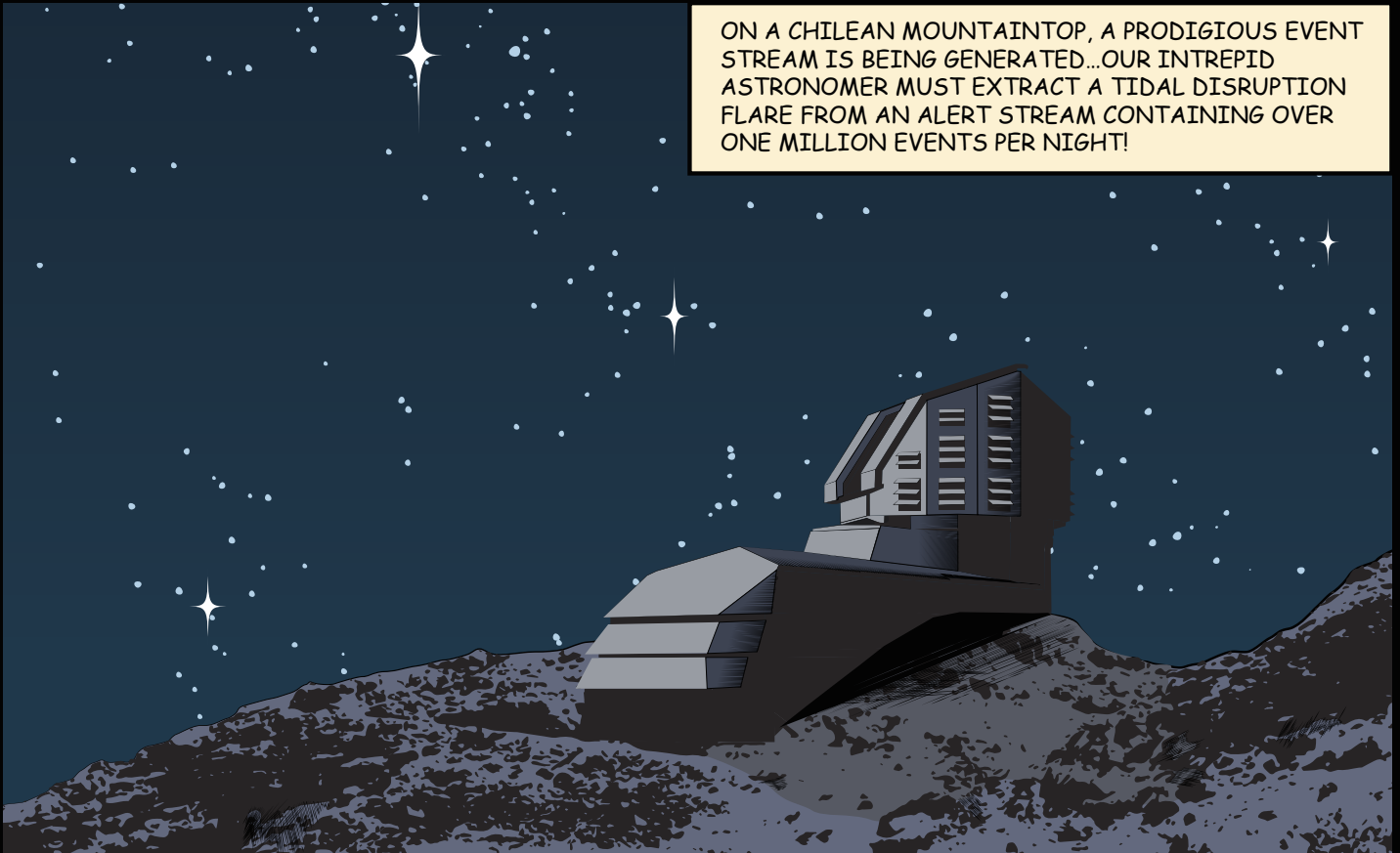
# Tales of the Modern Astronomer

# ANTARES RISING

I'M HOPING TO  
SEE A TIDAL  
DISRUPTION  
FLARE TONIGHT!



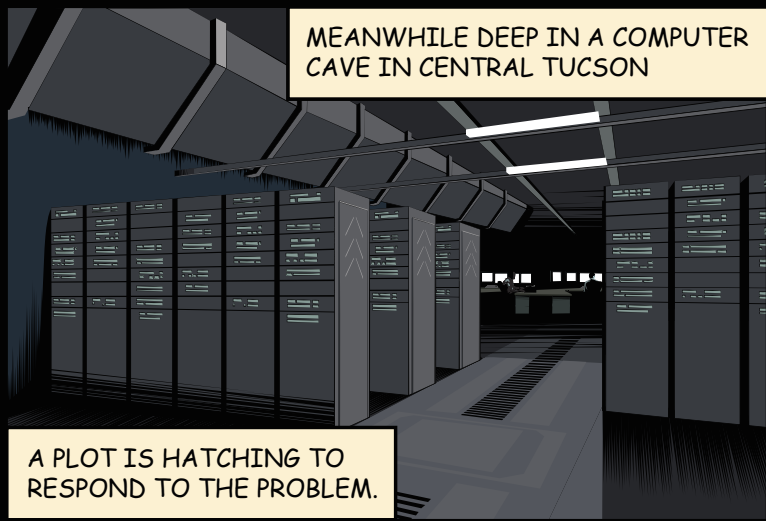
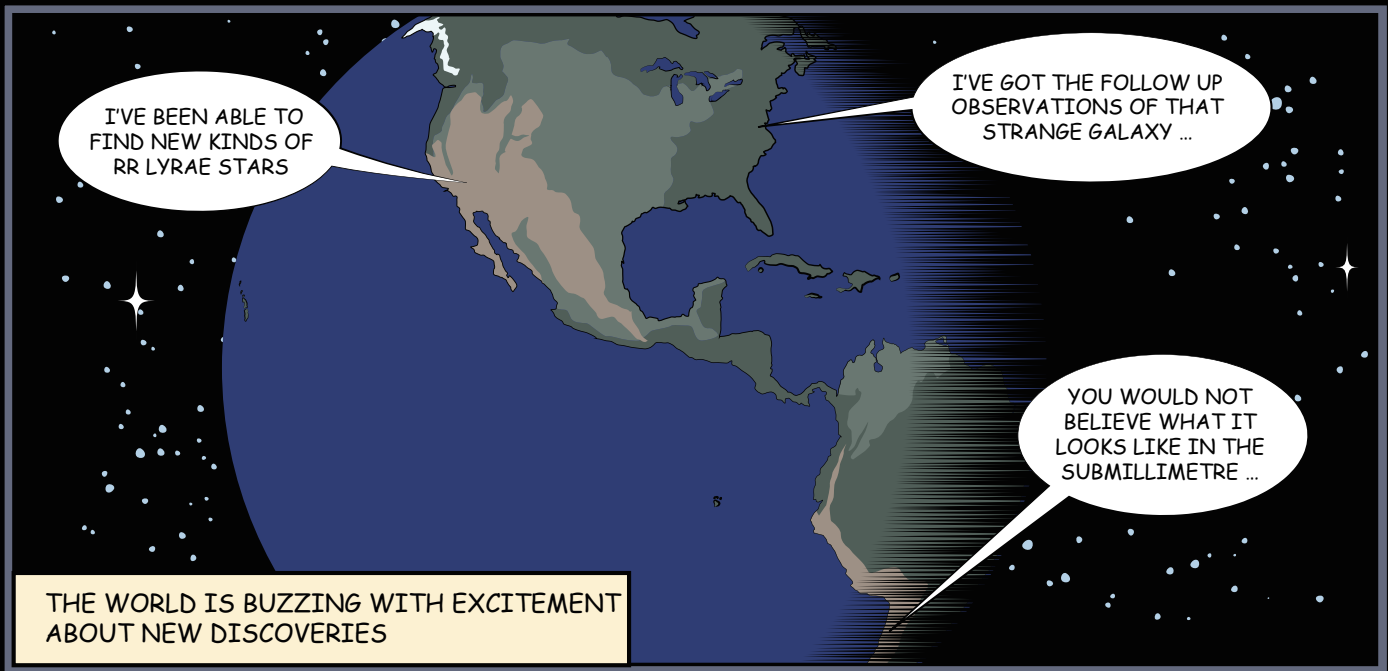
ON A CHILEAN MOUNTAINTOP, A PRODIGIOUS EVENT STREAM IS BEING GENERATED...OUR INTREPID ASTRONOMER MUST EXTRACT A TIDAL DISRUPTION FLARE FROM AN ALERT STREAM CONTAINING OVER ONE MILLION EVENTS PER NIGHT!

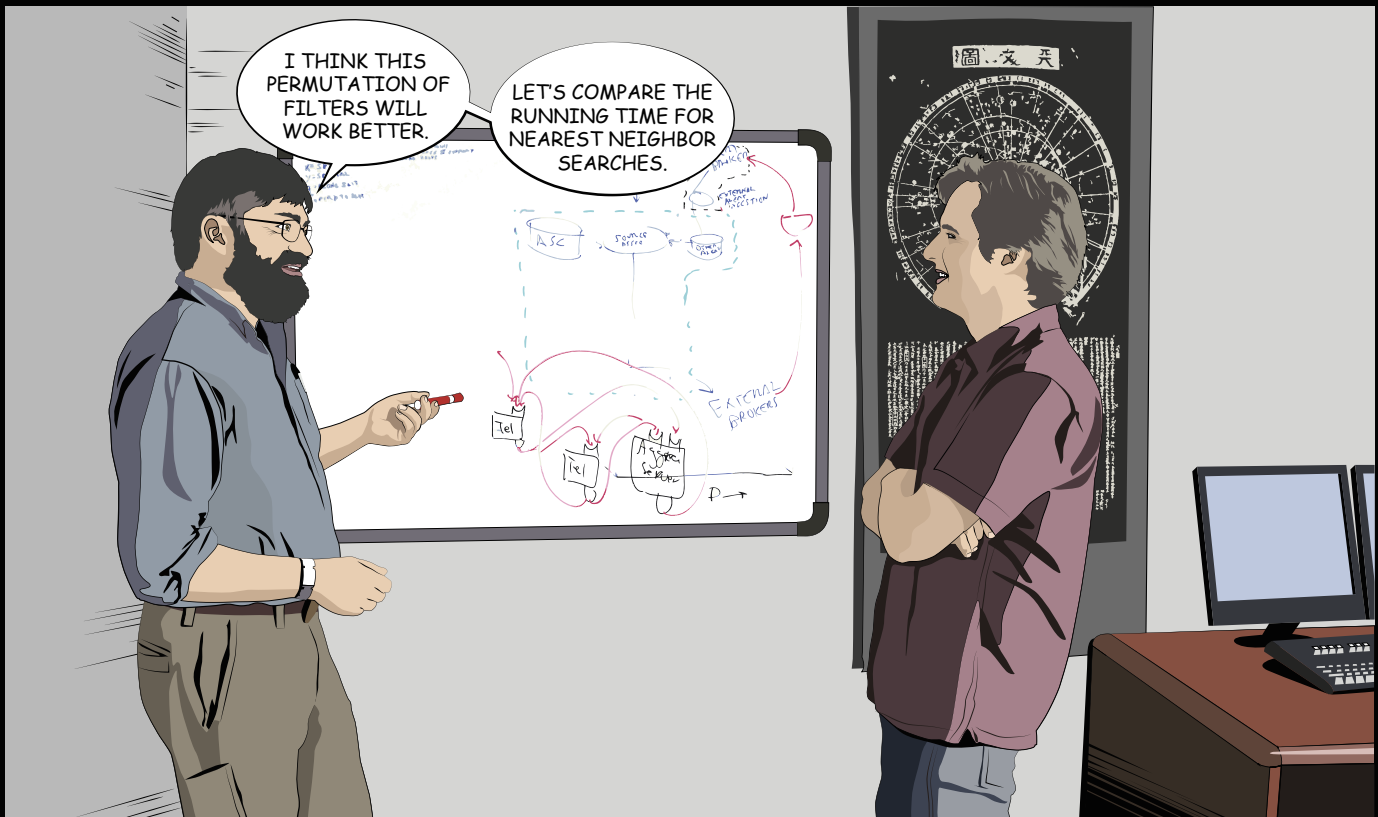


TELESCOPES FROM AROUND THE WORLD FOLLOW UP ON THE MOST CONSPICUOUS CASES.









I THINK THIS PERMUTATION OF FILTERS WILL WORK BETTER.

LET'S COMPARE THE RUNNING TIME FOR NEAREST NEIGHBOR SEARCHES.

YAY, I FOUND MY TIDAL DISRUPTION FLARE!

NOW TO UNRAVEL ITS MYSTERIES!



I THINK WE CAN FIND NEW EBOLA OUTBREAKS WITH THIS SOFTWARE SYSTEM

IF ONLY IT COULD BE USED ON MY EMAIL.

ZETTABYTES OF DATA DON'T SEEM QUITE SO SCARY NOW.



To be continued...

# Tales of the Modern Astronomer

# FIRST BYTES:

# DAWN OF THE DATA

FINDING THAT FIRST TIDAL  
DISRUPTION FLARE WAS SO  
INTEGRAL TO EVERYTHING  
I'VE DONE SINCE!

NOW I HAVE SO MUCH  
DATA...LEARNING TO WORK  
EFFICIENTLY WITH LARGE  
DATA SETS HAS BEEN  
CRUCIAL!

PREPARING FOR THE FUTURE OF ASTRONOMY

AT THE AAS MEETING







AT THE LA SERENA SCHOOL FOR DATA SCIENCE IN CHILE





COFFEE BREAK AT "THE TOOLS FOR ASTRONOMICAL BIG DATA MEETING" IN TUCSON.

MY CURRENT RESEARCH INVOLVES UNCOVERING NEW STRUCTURES IN THE HALO OF THE MILKY WAY.

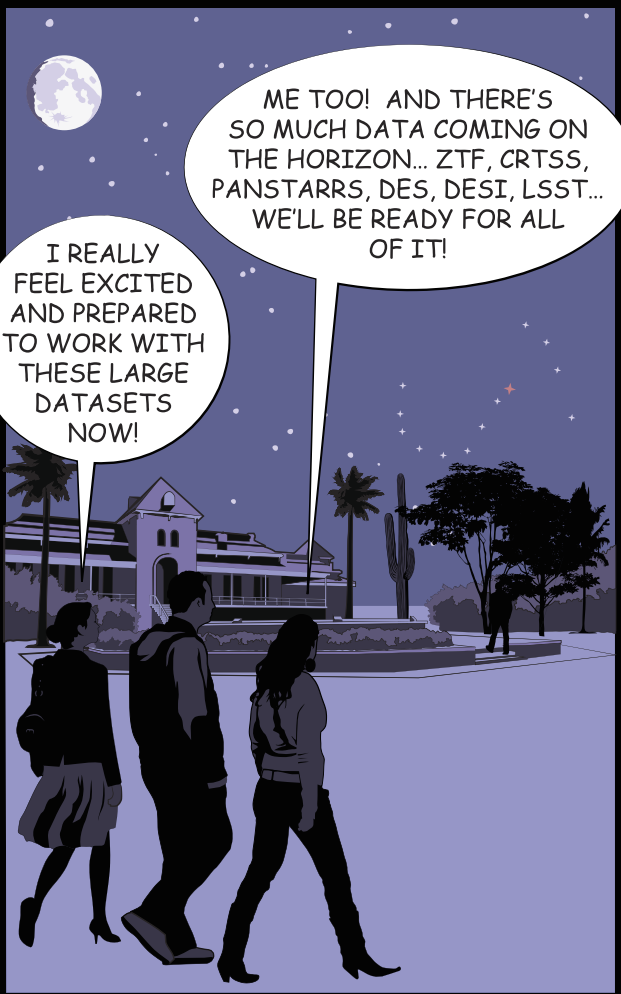
MY RESEARCH GROUP IS WORKING ON THAT PROBLEM AND WE HAVE AN OPENING FOR A POST-DOC WHO IS GOOD AT USING TOOLS TO EXPLORE LARGE DATA SETS.

GOOD THING I CAME TO THIS MEETING!



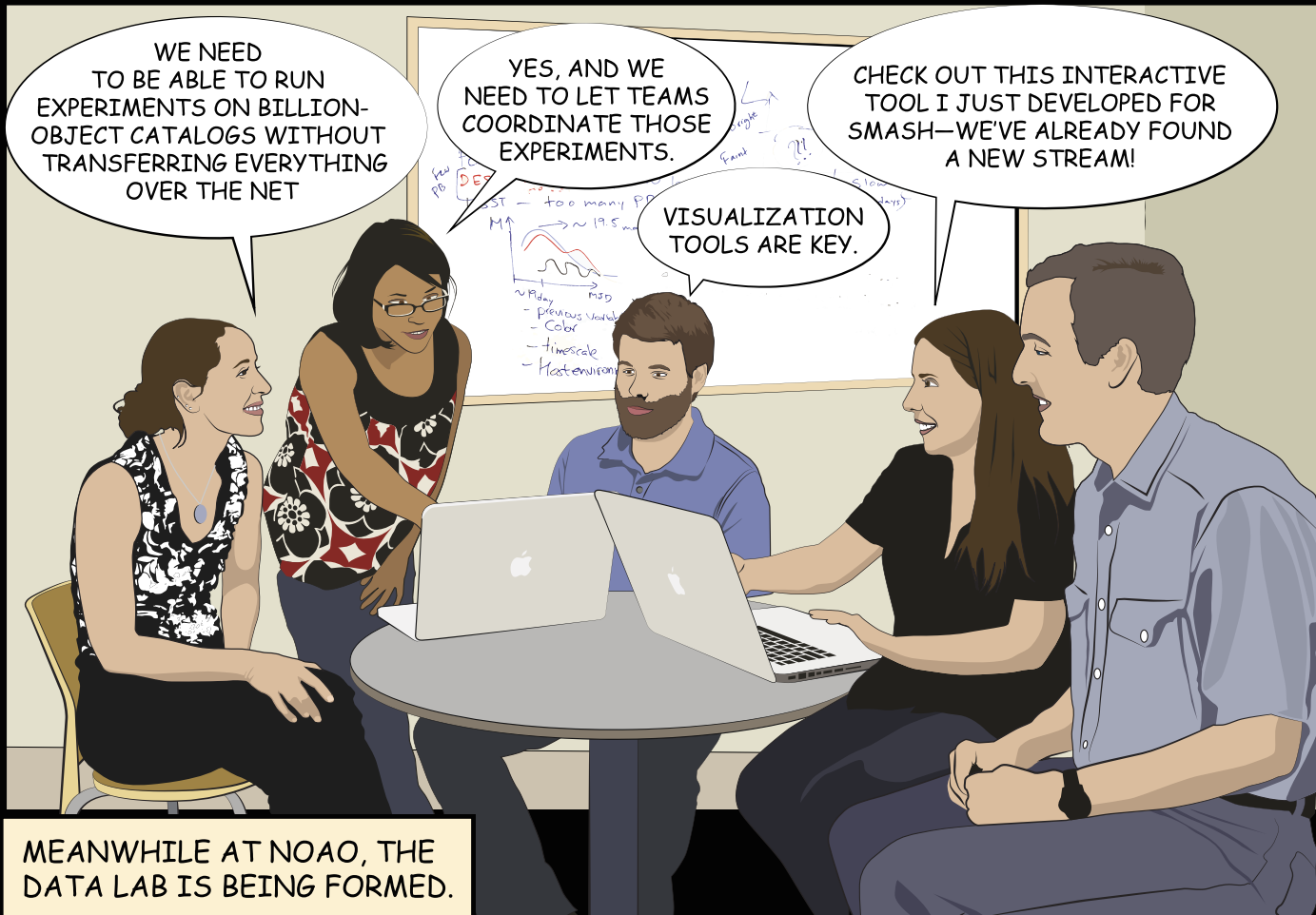
I AM LOOKING FORWARD TO WORKING WITH THE NOAO DATA LAB

THIS SCHOOL HAS BEEN GREAT!



I REALLY FEEL EXCITED AND PREPARED TO WORK WITH THESE LARGE DATASETS NOW!

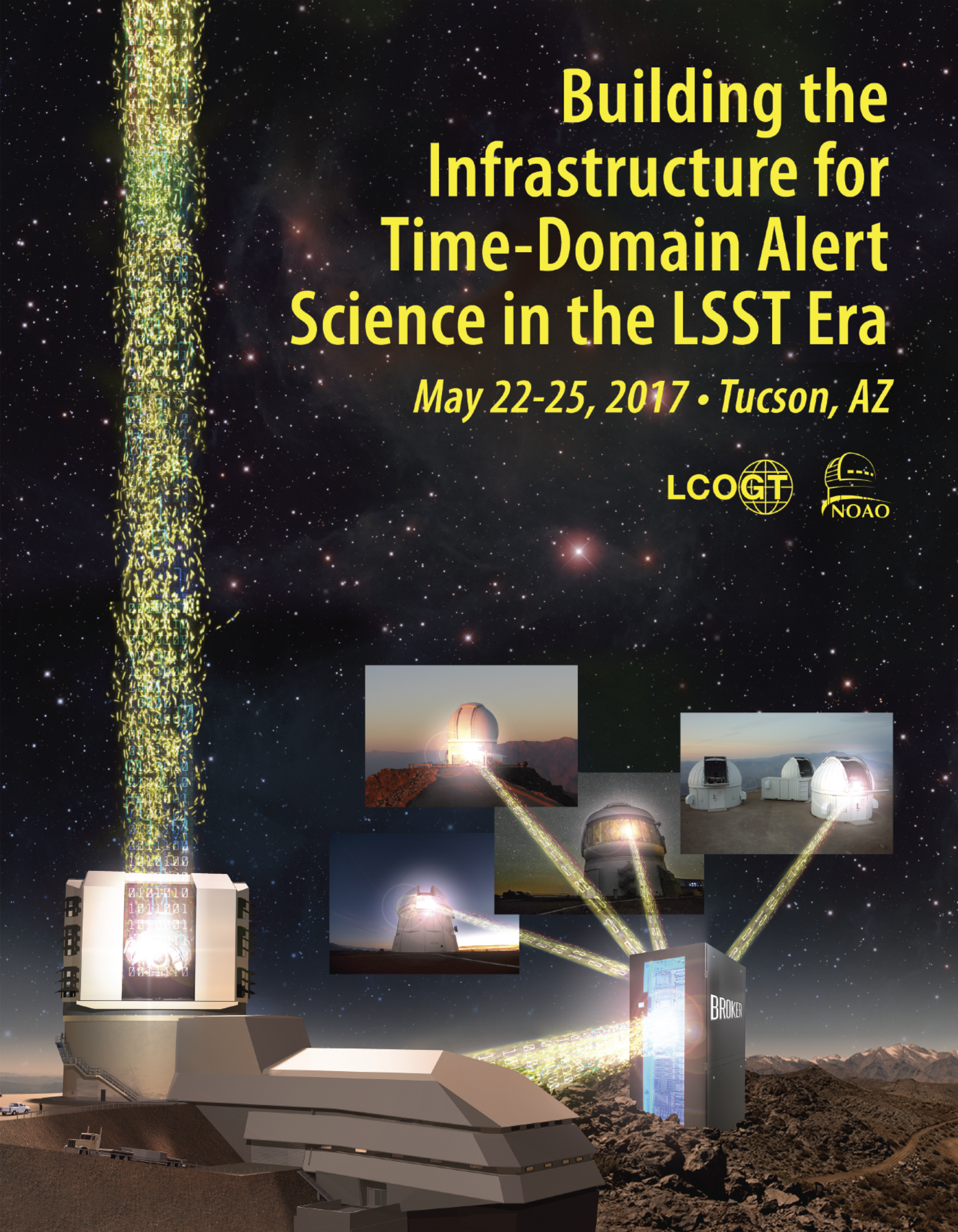
ME TOO! AND THERE'S SO MUCH DATA COMING ON THE HORIZON... ZTF, CRTSS, PANSTARRS, DES, DESI, LSST... WE'LL BE READY FOR ALL OF IT!



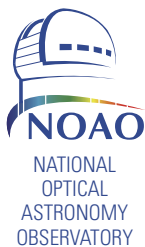


# Building the Infrastructure for Time-Domain Alert Science in the LSST Era

May 22-25, 2017 • Tucson, AZ







\$2.50 US  
AAS Meeting  
3



*Tales of the Modern Astronomer*

# BOOM GOES THE NIGHT



A LONG TIME AGO  
TWO BLACK HOLES  
MERGED IN A  
**CATAclysmic  
COLLISION**  
OF **COSMIC  
PROPORTIONS**

EARTH: PRESENT DAY

HEY, I THINK I JUST DETECTED ANOTHER GRAVITATIONAL WAVE SOURCE!

ANOTHER ONE, ALREADY?

CAN WE FIND AN OPTICAL COUNTERPART TO THE LIGO DETECTION?

IT'S SOMEWHERE IN THIS REGION.

HOW ARE WE GOING TO FIND THE NEEDLE IN THE HAYSTACK?

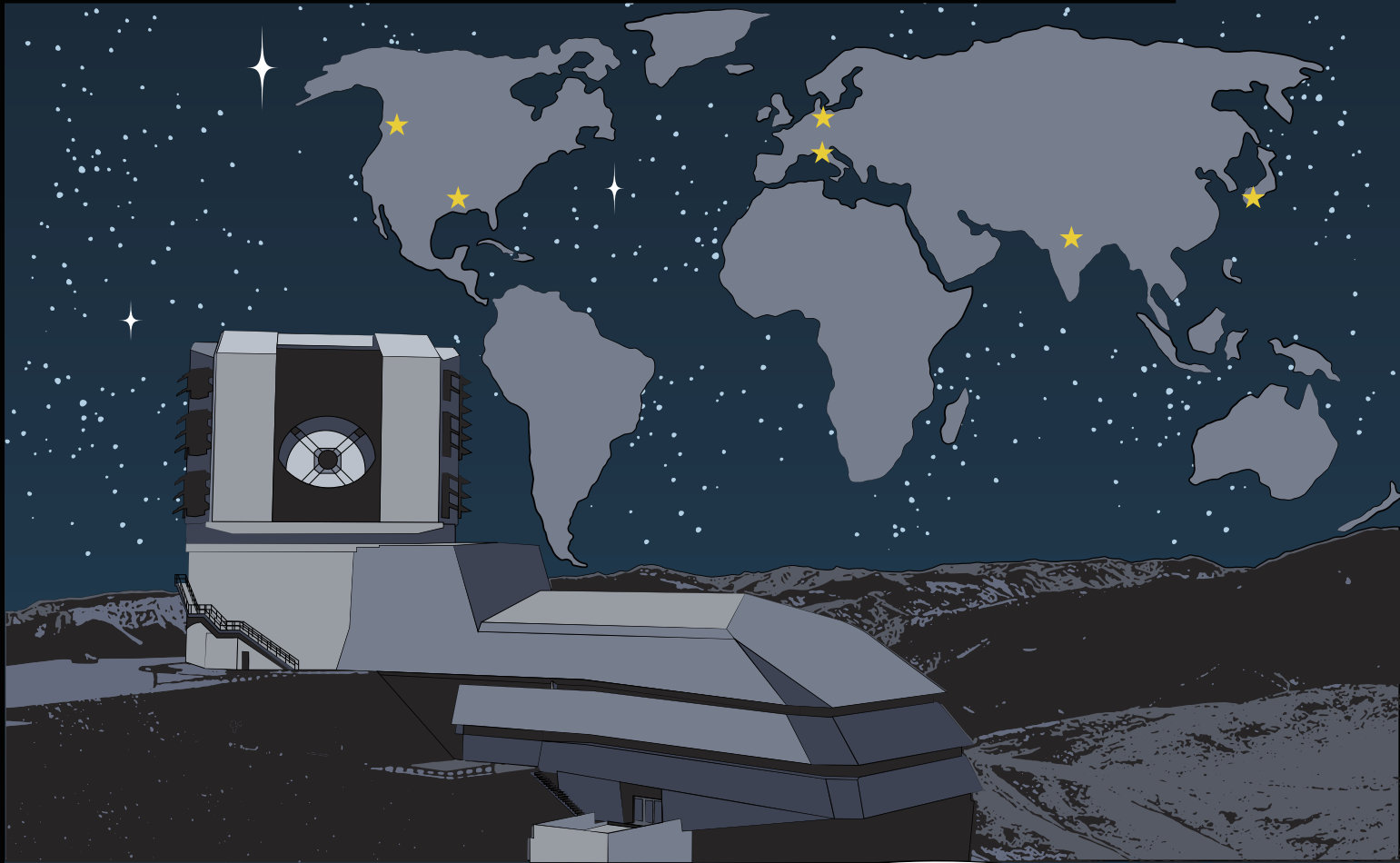
REMOVE THE HAY, WITH ANTARES.

CAN WE DO THIS NOW?

NOT YET, BUT SOON!

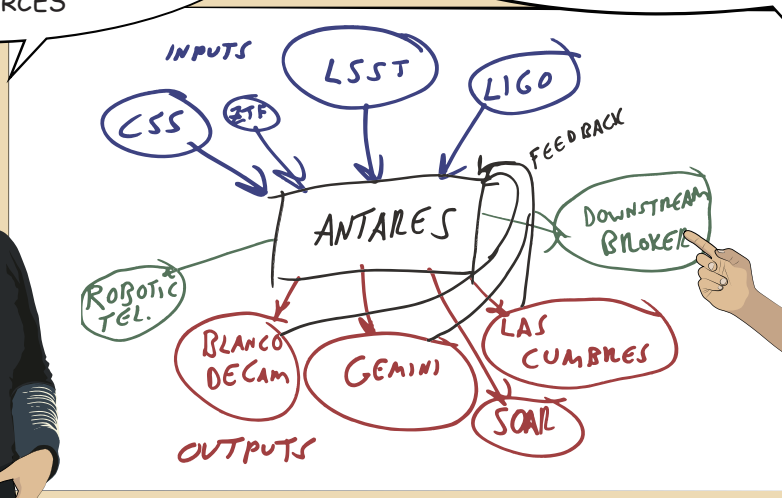



IN THE NOT TOO DISTANT FUTURE, AN ADVANCED GRAVITATIONAL WAVE DETECTOR NETWORK HAS BEEN CONSTRUCTED AT SITES AROUND THE WORLD AND THE LARGE SYNOPTIC SURVEY TELESCOPE HAS SEEN FIRST LIGHT...



WE CAN USE ANTARES TO ANALYZE DATA FROM LSST AND THE ADVANCED GW DETECTOR NETWORK TO FIND CANDIDATES FOR THE OPTICAL COUNTERPART TO GRAVITATIONAL WAVE SOURCES

ANTARES ANNOTATES ALERTS WITH DATA FROM EXTERNAL SOURCES SUCH AS LIGO AND APPLIES A SERIES OF FILTERS WHICH WILL HELP US IDENTIFY THE SOURCE OF A LIGO DETECTION

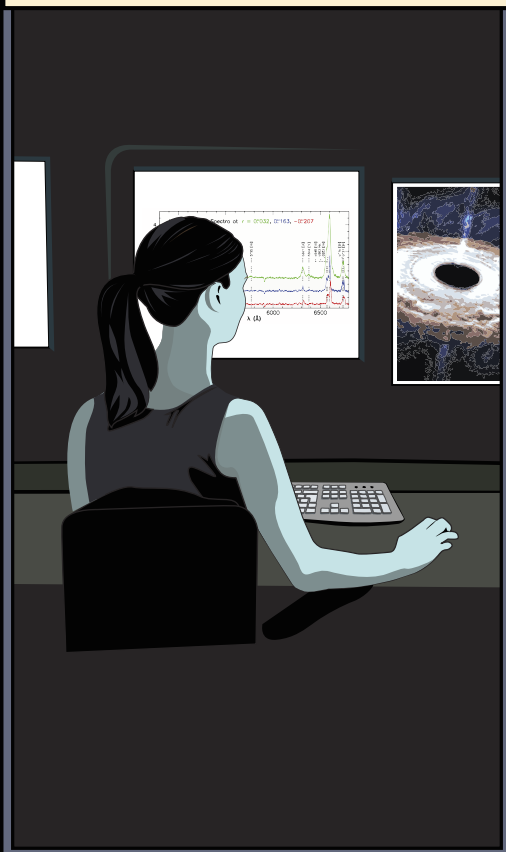




WE HAVE A FEW DOZEN CANDIDATES FOR THE OPTICAL COUNTERPART IN THIS REGION!

THE DARK ENERGY CAMERA WOULD BE A GREAT INSTRUMENT TO USE FOR FOLLOW UP.

AND SO BEGINS THE ERA OF LSST FOLLOW UP. NETWORKS OF TELESCOPES AROUND THE GLOBE CONTROLLED BY SOPHISTICATED AND SMART SOFTWARE WATCHING THE DYNAMIC SKY.



WE NEED TO OBSERVE OUR TEN MOST LIKELY CANDIDATES...LET'S GET SOME FOLLOWUP SPECTRA ON THESE

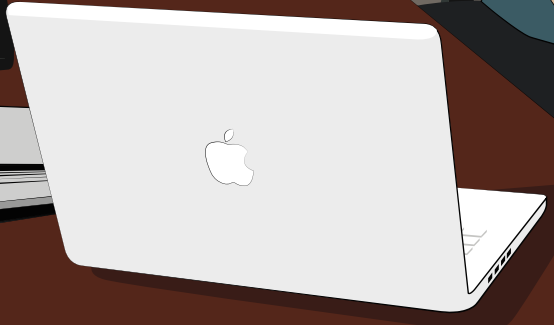
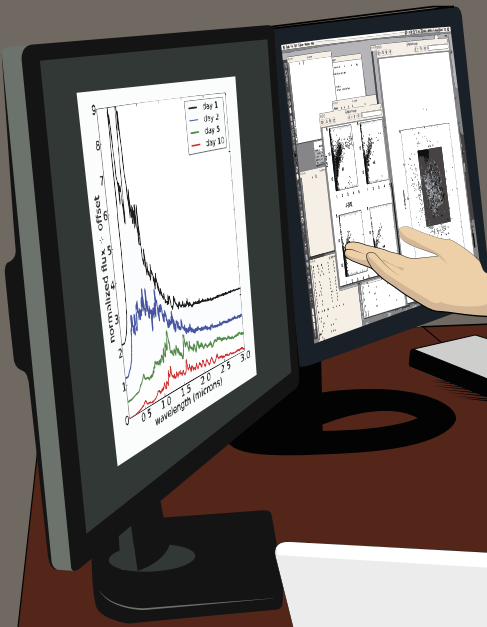


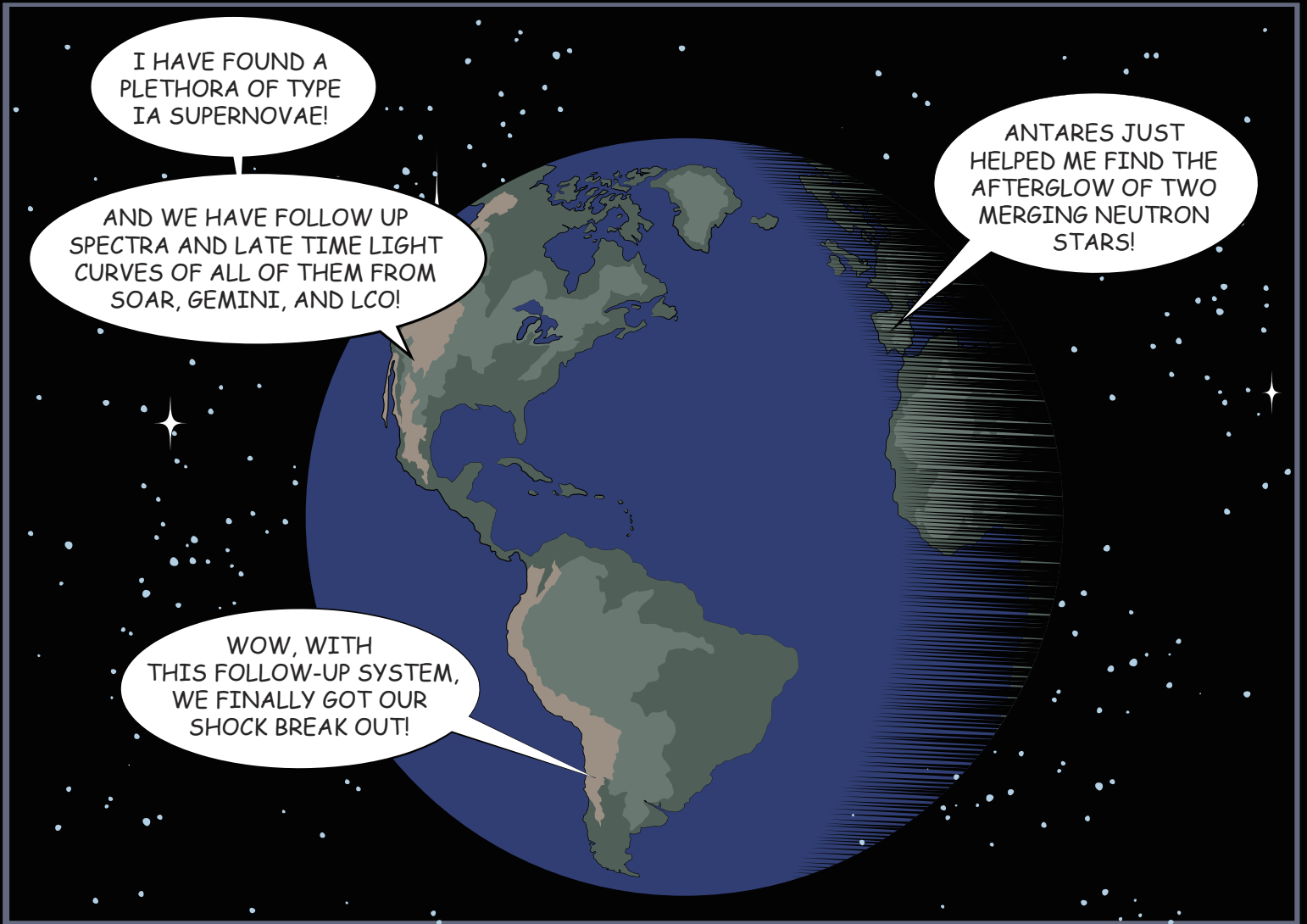
GEMINI CAN GO AFTER THE FAINT ONES AND SOAR CAN GO TO WORK ON THE BRIGHTER ONES



BOOM! LOOK AT THAT SPECTRUM... WE HAVE TO MONITOR THIS FOR THE NEXT WEEK!

I THINK WE GOT IT!





I HAVE FOUND A PLETHORA OF TYPE IA SUPERNOVAE!

AND WE HAVE FOLLOW UP SPECTRA AND LATE TIME LIGHT CURVES OF ALL OF THEM FROM SOAR, GEMINI, AND LCO!

ANTARES JUST HELPED ME FIND THE AFTERGLOW OF TWO MERGING NEUTRON STARS!

WOW, WITH THIS FOLLOW-UP SYSTEM, WE FINALLY GOT OUR SHOCK BREAK OUT!



**National Optical Astronomy Observatory**

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