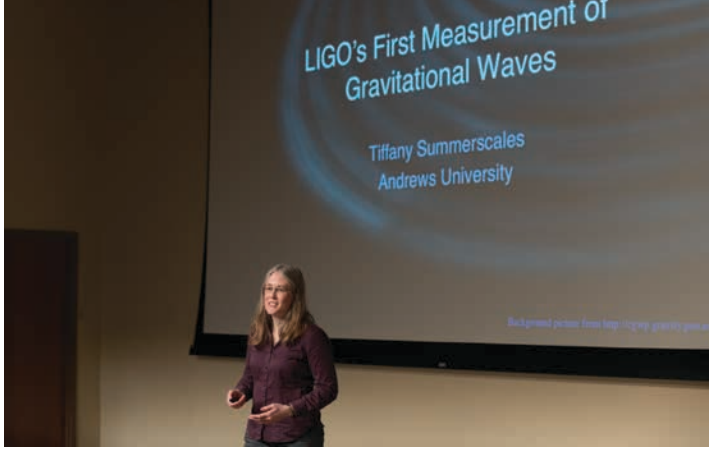
HISTORIC WAVELENGTHS

On February 11, 2016, the National Science Foundation and LIGO (the Laser Interferometer Gravitational-Wave Observatory) announced that they had directly measured a gravitational wave for the first time. This made great waves (yes, we went there) in the science and technology world, and also on the Andrews University campus. Tiffany Summerscales, associate professor of physics, was one of 1,000 worldwide researchers on the LIGO team, working out how to prove a theory Einstein posited a century ago—which they did. Becky St. Clair, media communications manager, talked to Summerscales about her experience on this project, lessons learned, and hopes for the future.

Physics students, staff and faculty, plus other interested individuals, attended a live screening of the announcement on Feb. 11, 2016



Tiffany Summerscales, associate professor of physics and LIGO team member, gave a public presentation about the groundbreaking news

WHAT'S THE DIFFERENCE BETWEEN GRAVITATIONAL WAVES AND GRAVITY WAVES?

Gravity waves are liquid or gas driven into waves by gravity. Sometimes when you look up in the sky you see wavy clouds layered in stripes, and that's because of a gravity wave in our atmosphere—a wave in the gases. Gravitational waves are ripples in space itself. These ripples are very weak, so it's impossible to see their effects in everyday life.

WHY IS THE DISCOVERY OF GRAVITATIONAL WAVES IMPORTANT?

These waves come from very violent and exciting events in the universe—events that are very mysterious—things we don't know a lot about because they don't give off much light, such as black holes, neutron stars, stellar remnants, very dense asymmetrical objects bumping into each other during orbit, supernova explosions. For example, black holes don't give off much light, but they do give off gravitational waves. If we can study these waves, we can learn more about the astronomical events that produce them. It would be very exciting to find gravitational waves somewhere we didn't expect.

SO WHAT NOW? WHAT'S NEXT FOR THE LIGO TEAM?

I'm part of a team of LIGO researchers developing and testing a computer algorithm that analyzes the gravitational waves we can now detect. This algorithm pulls out as much data as it can from each wave it detects, such as where the wave came from, what its shape is, etc. We need to improve this algorithm so it can collect as much information as possible.

WHAT DO YOU THINK WAS THE LAST REALLY BIG DISCOVERY IN ASTRONOMY?

Hubble just announced it has seen the farthest galaxy that's ever been seen, so that's pretty incredible. But I think the most recent big discovery that's excited me was the New Horizons flyby of Pluto. The pictures we got and the things we learned about Pluto are amazing. We thought it was a boring lump of icy rocks, but it has mountains, and the mountains have snow, and this snow isn't made of water, it's made of methane. We have so much to learn about our universe.

WHAT INSPIRED YOUR INTEREST IN PHYSICS AND ASTRONOMY?

In high school my favorite class was math, so when I got to college and had to pick a major, I picked the one with the most math: physics. And I've always enjoyed looking up at the stars and thinking about how big the universe is. I remember my parents showing me the Big Dipper when I was very young, and I loved seeing the northern lights while growing up in New Hampshire. I have a well-worn edition of National Geographic Magazine with pictures from Voyager 2, back in the day when it flew by the outer gas giants. That was in August 1990. The pictures we have now make these images look so grainy, but I remember seeing these pictures of Io [one of Jupiter's moons] with the volcanoes and it really excited me.

WHAT ADVICE WOULD YOU GIVE A YOUNG PERSON INTERESTED IN STUDYING SPACE AND THE UNIVERSE LIKE YOU DO?

If you want to be involved in astronomy or any branch of physics, make sure you study as much math as you can. Math is very important. It's also important to learn all you can about everything and be curious about why things are the way they are. Always ask questions and try to find the answers. Then study more math.

WHAT'S SOMETHING YOU STILL REALLY WANT TO KNOW ABOUT PHYSICS?

The biggest question I still have is what happens inside a black hole. That's something nobody knows.

WHAT DO YOU THINK THE DISCOVERY OF GRAVITATIONAL WAVES MEANS FOR THE FUTURE OF ASTRONOMY?

Every time we've found a new way to look at the universe we've discovered something new. Now we have a new way of doing astronomy, and hopefully we'll be able to use that to learn things about the universe we never knew before.

THIS IS ALL WORK TALK; TELL ME SOMETHING YOU DO FOR FUN.

I love to read. And I love to read about space. I highly recommend "The Martian" by Andy Weir. It's a fictional piece about the first astronaut to walk on Mars. He's left behind during a dust storm and has to use his scientific know-how and human ingenuity to survive. It's a fantastic book; a really exciting read.

AT ANDREWS WE TALK A LOT ABOUT INTEGRATION OF FAITH AND LEARNING; HOW DOES THIS CONCEPT COME INTO PLAY IN YOUR WORK?

I believe God is Creator and that His creation shows us elements of His character. Studying the universe has shown me that God is imaginative and loves variety. His creation also has such great depth that we will never run out of surprises or things to explore. And as a scientist and a Christian, I absolutely love that. ■