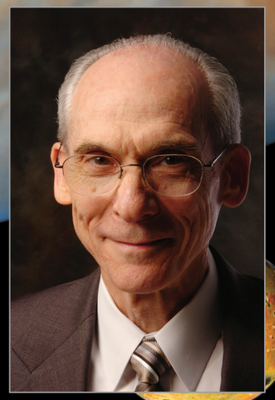
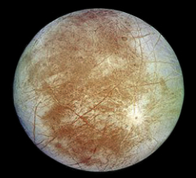
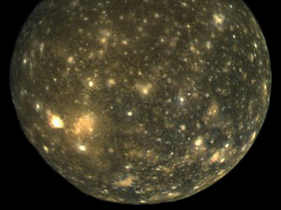


NASA file photo





Rock on, Dr. Stone!

SCC alumnus Dr. Edward Stone (BJC, '56) likes big mirrors. Really, really big mirrors. And when he looks in those mirrors, he doesn't see his reflection, he sees giant space rocks and stars. Actually, Dr. Stone is a rock star of sorts. In the field of space exploration, he's somebody.

We recently checked in with SCC's first-ever Distinguished Alumnus Dr. Stone about some of his accomplishments, challenges, and thoughts on the next generation of scientists.

You were the Principal Investigator for the Voyager space probes, one of the most successful missions NASA ever conducted. What are some of its lasting lessons?

Voyager 1 and Voyager 2 revealed so much diversity in our solar system. They toured Saturn, Jupiter, Uranus and Neptune as well as many of their moons. Everywhere they visited revealed something new. The weather, the moons, the rings, the magnetic fields were all different and distinct. We didn't expect that.

And they're still in operation?

Yes. Once they finished their initial mission to survey Saturn, we were able to reprogram them to visit Jupiter, Uranus and Neptune. Even though each craft was only designed to last five years, they've sent data back daily since 1977. They should be able to send us data for easily another ten years. Now both spacecrafts are the most distant objects man has ever sent into space. They are further away from the sun than all of the planets. Voyager 1 is over 115 times further away from the sun than the Earth, and Voyager 2 is 94 times further away. In five years, Voyager 1 will leave our solar system completely. I'm anxious to see what happens when it does.

Keck Observatory file photo

Todd Mason Productions

NASA file photo

You served as head of NASA's Jet Propulsion Laboratory (JPL) from 1991 to 2001. What was that like?

I was fortunate to serve as leader during an incredible era of discovery. It was very rewarding to be plugged in to the whole process and learn so much from a group of very talented experts. I was able to lead teams that conducted some of the most successful projects in JPL history: the Hubble space telescope, a number of exploratory missions to Mars, missions to study Saturn, Jupiter, the sun and comets.

You were also instrumental in developing the largest, most sensitive visible and infrared light telescope in the world, the Keck Observatory. How is it different from other large telescopes?

Two things make it unique: its mirrors and its optics. Telescopes use mirrors to capture and focus light and so bigger mirrors mean more light. Most mirrors are made out of a single piece of glass, however there comes a point when you can't make a mirror any larger. Keck uses an array of 36 hexagonal mirror segments that work in unison. Each segment is individually controlled to focus the light to within a millionth of an inch. That allowed us create a mirror that is 33 feet wide.

The other is adaptive optics. The atmosphere makes starlight twinkle much the same way that the water in a swimming pool makes shadows dance along the bottom. Keck utilizes adaptive optics to compensate for all of that by making precise adjustments a thousand times per second to give us a clear picture.

Now you've moved on to building what will be the next big telescope. How is this one different?

Size. The new telescope is called the Thirty Meter Telescope, or TMT. Once completed, its mirror will consist of 492 mirror segments and be almost 100 feet in diameter, making it nine times more sensitive than Keck's mirror. Its adaptive optics will be nine times more sensitive on top of that. In other words, it'll be 81 times more sensitive than Keck.

What do you hope to do with it?

The TMT will allow us to look back at the very first stars. The light we see today left those stars long ago. So when we look at the most distant, faintest stars, we're actually seeing them as they were billions of years ago. To capture that light, you need a very, very big telescope.

What gets you out of bed in the morning?

Learning. I'm always learning something new. I still love looking at Voyager data and marvel at what we've learned.

I also love leading teams. Surrounding yourself with teams of experts who are discovering new things is exciting. It keeps me plugged into the whole process. I learn from them.

You're still in the classroom, what's that like? Have students changed over the years?

I love teaching. I think that by teaching something, you truly come to learn it for the first time. Today's students arrive at college knowing much more than students before. Technology has greatly advanced what they already know. The space race didn't even start until Sputnik launched in 1957-when I was in graduate school. We've learned a lot since then.

Today there are fewer US students entering into Science, Technology, Engineering and Math careers. Why do you think that's the case?

I think part of that is because there are so many options in other areas than ever before – so many more career choices.

What do you think would help boost numbers?

It's very important to engage students while they're still in middle school. They need to know that they can earn a good living, and learn and do a lot in those careers. Teachers should inspire students' curiosity. Kids need to be encouraged to continue on this track versus other options. It starts at an early age.

Was that your experience?

Yes. I benefitted a lot from various teachers who got me involved above and beyond regular class work. Wilfred White was a key mentor for me while I was at Burlington High School and Burlington Junior College. He would let me work in the lab to build and learn. My math teacher Vivian Strand also challenged my math skills. I loved it. Those people really made a difference.

Any advice for today's college students?

When I graduated from Burlington Junior College, I couldn't plan for my career as an astrophysicist. It didn't even exist. Students should work to build a base of learning for when opportunities present themselves. Take courses that prepare you for what lies ahead. You don't know where life will take you.

Images (clockwise from left): Artist rendering of TMT mirror array; the Keck Telescope uses a sodium laser to calibrate its adaptive optics system; Stone; composite image of Jupiter and its moons; Stone and colleagues examine an image of Saturn returned by Voyager; in science club as student at BJC.

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