

News & Announcements

Top 10 Reasons for Summer Tutoring

10. Set yourself up for better grades
9. Get ahead for next year
8. Strengthen weak subjects areas
7. Build foundational understanding
6. Keep the brain flexible & nimble
5. Develop skills & confidence
4. Learn without pressure
3. Discover what is really interesting about a topic
2. Develop your understanding in ways that suit you
1. Explore whole new topics

STR in the Community

This spring, Dahlia Miller, owner of STR, as a Junior Achievement representative, coached a grade 6 class at Royal Oak Middle School to success in creating and running their own (profitable) business.

Next year, STR will continue to run workshops for middle school and high school level students, parents and teachers.

Workshop Topics Include:

- ▶ Study Skills for Parents
- ▶ Study Skills for Students
- ▶ Exam Preparation
- ▶ Memory Techniques

Summer Newsletter

"The Smart Connection" will be back in September with more great articles for students, parents & educators.

STR's Values

STR has been able to build a solid foundation in Victoria through working from its core values: honesty, professionalism, respect, and positive support of students, families & teachers.

Cool Things You Can Do with a Math Degree

This is the third in a series of articles looking at interesting jobs you can get with different university degrees.

Hugh Thompson

- ▶ Systems Research Engineer, NRC Herzberg Institute of Astrophysics
- ▶ Bachelors of Applied Science in Engineering

Educational Background

I have scientific parents: my dad's a mathematician and my mom's a bio-chemist. I think I had a slightly unusual childhood in that I just assumed that everybody went to university for ages and did lots of degrees and became professors. My brother and sister did those things, so I thought I would do that too and be a famous scientist.

I always loved building things as a kid. In that sense I probably always wanted to be an engineer, I just didn't know what it was called back then. I built a remote controlled propeller boat when I was young. I also built a telescope as a teenager. I didn't build things from kits, but eventually I did succumb to using plans with the telescope because I didn't get too far with my original scheme from scratch. I loved Lego, Capsella and Lego-Technix – that stuff was awesome. With it I built a car that had working cylinders and a working drive train so you could shift gears. That taught me a lot about engineering.

I always liked math. By the time I was in university I wasn't always that great at it anymore since I was so busy. There were so many courses it was hard to keep on top of it.

Math is a funny thing. You can be really good at it, but you can still do really badly. It's all just stepping stones – every step built on what has gone before. No matter how good you are at math intuitively, if you miss one of the steps, you're done. You have to know all the smaller bits to do the next bit. I don't think people appreciate this.

I did Engineering Physics – it's sort of a combined major between math, physics and engineering. It's a bit longer than most engineering degrees. It took me six years since I started in science in first year then transferred into Engineering Physics, which is a five year program.

I enjoyed university. I had some courses I really enjoyed. I was definitely too much of a slacker, though. I met people who started out doing something and then went back to school – they were more motivated. In some ways I think I wasn't quite as motivated as I could have been.

Working History

After university, my first job was in a pulp and paper research centre. I didn't enjoy smelly wood pulp: stirring it up and doing experiments on it. One afternoon, someone I worked with said his mom taught ESL in Korea and was looking for other teachers. So I taught ESL in Korea for a couple of years and that was very fun.

Then I worked for an ocean engineering consultant when I got back. I helped write proposals for things like underwater metal detectors and hockey puck dropping machines. It was a bit varied.

At that time I was keen on oceanography. I felt I ought to find out if I liked being on ships at sea. I knew of a Dutch head hunting company who looked for hydrographic surveyors around the world so I sent my resume off to them.

The Dutch company got back to me and the job I had was just ending, so I flew to the U.K. and took an offshore oil rig safety-training course which was really fun – with firefighting, burning buildings, jumping into life rafts and all kinds of crazy stuff.

I started working on a huge ship off of China. That was the most unbelievable on-the-job training. They were paying me a lot of money per day and I had zero skills necessary to do this job. Everyday I was supposed to be producing charts of the sea floor and where the pipeline was – all this important information. So I learned very quickly. I ended up doing that for about two years – all over the world – the Philippines, the North Sea.

Then I got a job in Richmond as a spacecraft engineer. I knew nothing about spacecraft, but it was a mechanical engineering job. Even so, they went out on a limb to hire me. They didn't pay me much to start with, but I turned out to be quite good at it and ended up working there for 8 years.

I started out doing thermal modeling of spacecraft. I also did some mechanical and structural modeling of spacecraft. Eventually I was the "Payload Engineer" for a set of five satellites. The payload was

About Us

We provide **1-on-1, in-home tutorial support** throughout Victoria, Saanich and Sooke.

STR was established in Victoria, BC in 2002 and has built a solid reputation for creativity and professionalism.

With over 50 tutors, we are able to find the best match for each student. Our tutors are certified teachers and professionals. They are carefully screened and chosen specially to match the needs and learning styles of each student.

Our goal is to enhance students' skills and to cultivate learning confidence through support that is truly individualized: matched specifically to each student's needs, recognizing each student's unique talents and abilities.

We support families in education.

For more information and resources, visit us on-line at:

www.SmartTutorReferrals.com

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an optical payload and I was always interested in telescopes and astronomy, so through that I learned more about optics. The telescopes were being built in Germany and I worked in Germany for two years. (This is basically the heartland of optics on the planet.) That was a very interesting place to live and work, and I learned a lot. Then I saw a job to work on this thirty-meter telescope project in Victoria. I actually happened to have experience in what they were looking for which was systems engineering.

Mostly I do things like writing requirements and figuring out how we will check that we can meet them. We have a plan for the whole observatory so we make a list of all the things it needs to be able to do, like: work so many days per year; withstand a certain size of earthquake; have certain optical abilities. Then we need to translate this into what the subsystems have to do. (What does it mean for someone building an instrument that will be mounted on the telescope.)

This is going to be the largest telescope in the world. In terms of resolution, we'll be able to see things that are 40 kilometres across at the distance of Jupiter (or closer to home this is like seeing a loonie in Calgary from Victoria). But we also plan to look much further, and the further away we can see, the further back in time we are looking. The idea is to look back to the beginning of time, when stars were first forming. As an engineering project it is unbelievable to build a telescope that really is just a layer less than one micron-thick of silver or aluminum, supported in this perfect shape, over 30 meters, on a mountaintop, in the wind. How on earth do you do that? We've divided it up into 492 hexagonal segments of glass, each 1.4 meters across and 50 mm thick, which have to move and relate to each other within nanometers. When I tilt this telescope up, for example, I need to compensate for the pull of gravity on the shape of this 30 meter surface. It's all really interesting to me.

Advice for Students

Math is totally awesome. I think it's well worth getting a good understanding of the fundamentals of math. It's really easy to go from higher level understanding to more

applied. It's a lot harder to go the other way. If you know how lots of math works, you can always apply that to lots of different sciences and lots of different fields. If you know how plumbing fittings work, for example, you can't apply that to how math or other sciences work.

Co-op terms and any opportunities you have to see science in action are so motivating that you have to take them.

There's a lot to be said for picking up a couple of marketable skills. In engineering, often this is new computer tools which are actually quite easy to learn. Companies always need people who can run these programs and you can get a decent paying job on the bottom floor doing something quite interesting.

Be a little careful not to just get these skills and stay there your whole life.

I was always too chicken to get involved with a club. I always felt I didn't know enough to join clubs. You've got to just get involved and try. There are things like engineering groups that build cars that they race. You've got to do as many of those as you possibly can get involved with.

One of the things that helped me was setting up engineering challenges for high school students when I was in university. Tutoring also motivated me. I needed to be able to understand math at a decent level in order to be able to teach it.

Use the things that you're learning by teaching or building things. Volunteer for professors who need help.

I always feel like, "As long as I'm learning, I'm happy." If my job is paying me to learn new things, I'll keep doing my job. If my job isn't helping me to learn, I'll just go back to school.

In general be keen, and let people know you are keen, it may not be cool, but it's very important to teachers and employers.

"Nobody succeeds beyond his or her wildest expectations unless he or she begins with some wild expectations."

Ralph Charell, American author