

Letter from the President

Hi everyone! A very warm welcome to all you first years, and a slightly more tepid welcome back for everyone else. I'm Justin, president of the University of Sydney Physics Society, otherwise known as PhySoc.

The first thing that's probably on your mind (other than "Who are these strange people trying to sell me T-shirts?") is: What are PhySoc and Jeremy?

PhySoc is a collective of physics students, that holds events for physics students and enthusiasts, intended to make your uni life a tad more interesting. We hold social events, including Liquid Nitrogen Ice cream (this Friday the 21st, from 1PM at Habitat), BBQs (next Tuesday, the 25th from 12:30PM, on the Physics Rooftop), Trivia Nights, Movie Nights, etc. We also hold fortnightly talks on the crazy-cool things being cooked up in the School of Physics: from light sail based interstellar probes to synthetic neurons; from quantum computing to cloaking devices.

Onto the next question: What's Jeremy and why is it called that?

Jeremy is a fortnightly (for now) publication put together by PhySoc, on all things physics related, such as physics news, comedy and puzzles. After a five year hiatus, we've stitched it back together from scraps of thought from across the School of Physics, and brought it back to life. It's the Frankenstein's monster of student publications. Why is it called Jeremy? No idea.

Anyway, we hope to see you come along to our events and become a part of our physics community. Come along to liquid nitrogen ice cream this Friday, and the BBQ next Tuesday, and meet your peers! It'll be fun! I swear!

If you want to write for us at Jeremy, message our Facebook page, or email us at jeremy.physoc@gmail.com.

See you around!

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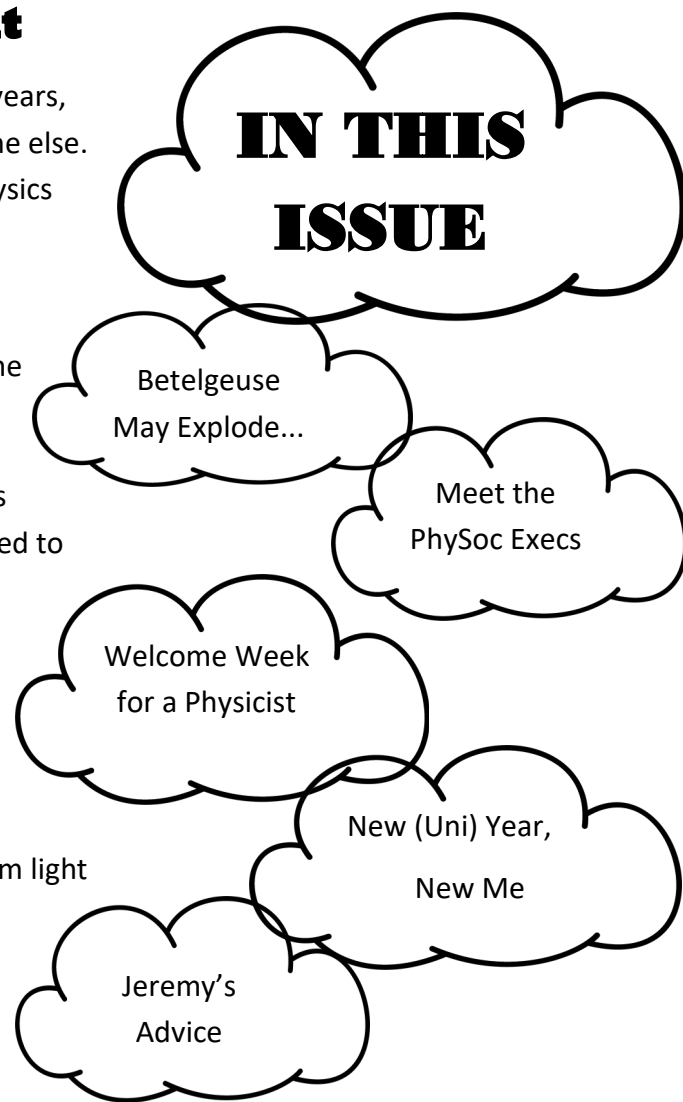
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Betelgeuse may explode...

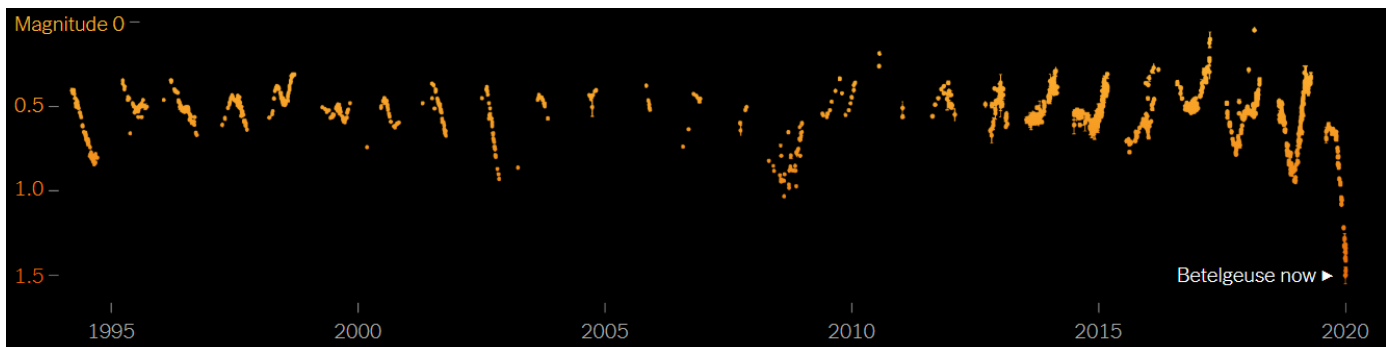
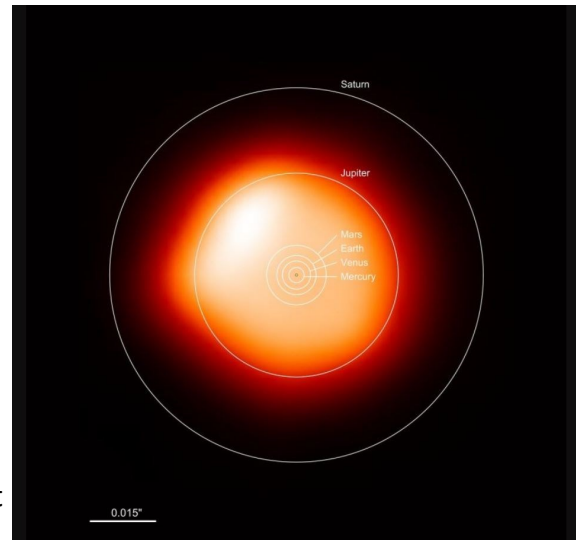


...but it probably won't. But it also might so we're going to look at it anyway. Classified as a red supergiant, Betelgeuse is the 11th brightest star and one of the largest that is visible to the naked eye. If you want to find it, you need to look at the shoulder of Orion. However, over the past few weeks the brightly shining bicep of the hunter has been dimming with reports suggesting it is over 50% dimmer than its normal brightness, [1]. So what is going on?

Left: The constellation of Orion with Betelgeuse shown on left shoulder, Rob Skiba, timetobelieve.com

Below: To scale diagram of Betelgeuse, Andy Briggs, earthsky.org

Well the answer is two-fold. For starters we know that Betelgeuse is dying, and astronomers estimate that the star will explode as a supernova some time within the next 100,000 years or so. Which could mean that it has already exploded and we just haven't detected it yet because of the 600 light year distance between the Earth and the giant, or it could mean that humanity will be living on Mars before the explosion even starts. So there is a tiny, tiny, tiny chance that we might, maybe, just get to see a supernovae in our lifetime.



Above: Betelgeuse's brightness cycle has a 6 year and a 425 day cycle
Corum, J. (2020). *Waiting for Betelgeuse to Explode*. [online] Nytimes.com. Available at: <https://www.nytimes.com/interactive/2020/01/09/science/betelgeuse-supernova-fading.html> [Accessed 17 Feb. 2020].

Don't get your hopes up though, Betelgeuse is known to have periodic fluctuations in its brightness with a main cycle of approximately six years and minor cycles of roughly 425 days, [1]. Villanova University's Edward Guinan has suggested that the significant reduction in brightness currently observed is the result of these two cycles reaching their minimums around the same time, [1]. Such an overlap would cause an unprecedented dimming, but there's a third option. The varied brightness change observed could be the result of dust and debris or it could be the Death Star obscuring our view.



Right: "Death Star", Derek Elshof, artstation.com

Below: "Rogue One Death Star firing on Jedha city", Evan Olsen, flickr.com



Introduced in the original Star Wars film (Episode IV: A New Hope) the Death Star is estimated to be over 120 kilometres in diameter and gains power by draining nearby stars. This is an immediate explanation for the sudden and continuous dimming of one of our closest supergiants, but there's more.

A gravitational wave has apparently been detected emanating from Betelgeuse's surrounding area, [2]. Whilst the wave was more than 10 degrees from the star [2], too big a distance for the wave to originate from Betelgeuse itself (unless you estimate like an engineer), an object the size of the Death Star moving through spacetime could result in a gravitational wave. Whilst the Death Star, being a massive object, cannot travel at the speed of light, gravitational waves can so this detection may be our early warning system to ready the Earth for an oncoming attack. Betelgeuse may not explode...

...but we might.

— Martine

1. Drake, N. (2020). *A giant is acting strange, and astronomers are buzzing.* [online] National Geographic. Available at: <https://www.nationalgeographic.com/science/2019/12/betelgeuse-is-acting-strange-astronomers-are-buzzing-about-supernova/> [Accessed 17 Feb. 2020].

2. Ashley Strickland, C. (2020). *The supergiant Betelgeuse star will explode. It's just a matter of when, astronomers say.* [online] CNN. Available at: <https://edition.cnn.com/2020/01/25/world/betelgeuse-star-dimming-scn-trnd/index.html> [Accessed 17 Feb. 2020].

Meet the



Justin Brown—President

Serial degree hopper, bookworm and sci-fi junkie. I'm a third year Science/Adv Studies student majoring in physics and math. I've wanted to be a physicist since I was a kid. To me, it's about how the world ticks. There's a beauty in the way particles dance around each other to make up the world that we live in. Plus, physics is where bleeding edge tech is developed, from photonics to quantum computing. With PhySoc, my hope is to help share the beauty of physics and the possibilities it enables, and have some fun along the way.

Emily Shaw—Vice President

I'm a second year student majoring in physics and economics but my interests extend beyond this into reading, photography, everything science-related and especially getting to know new people. I think physics is unique in its ability to show us how everything works in the world around us. To me, PhySoc is about sharing our fascination for this subject and creating a strong community along the way so I'm very excited to meet you all this year.



Riley Havela—Treasurer



Fergus O'Sullivan—Secretary

Heya, I'm Fergus and I love science!! They are all brilliant; there's squishy physics (biology), slow physics (geology), impure physics (chemistry), physics without units (maths), and so many other types of physics. As I said science is great. I am a second-year Bachelor of Science/Bachelor of Advanced Studies student majoring in physics and mathematics. I love physics as it is like a pair of contact lenses that allow us to see the universe clearer, such that we can see our past and predict our future. As a part of PhySoc, I want to broaden the reach of the society and enrich the uni experience with brilliant events to engage physics with the other fields of science.



Exec Team

Tom Schwarz—General Exec



What does the duck say when it walks into the physics classroom? Quark! Hey I'm Tom, I study physics, computer science and more maths than my degree plan allows. I enjoy programming, debating, Model UN, talking over my friends ("on every topic possible" allegedly), juggling (which I am bad at) and board games (mostly just jungle speed - challenge me to a game!). I enjoy physics because it never stops having new exciting, interesting and baffling things to learn about. I hope with PhySoc to be able to help everyone enjoy and engage with all the cool stuff going on with physics at USYD, and the awesome people doing it.

Chloe Beydoun—General Exec

Hi, I'm Chloe! My passions are split between reading, dancing and travelling. I am a second year Bachelor of Science / Doctor of Medicine student majoring in physics and English. For me, the process of learning concepts in physics is often complex and challenging but also very rewarding as it offers a new and exciting perspective on the world. No matter where you are, at every turn physics is in action. Being a part of PhySoc means I get to share in a community that enjoys figuring out the 'why' and 'how' the cogs of our universe turn.



You?—First Year Officer

We are looking to appoint a First Year Officer at a general meeting in week 3. If you're looking to get more involved in the society, now's your chance!

Welcome Week For a Physicist

1. Join PhySoc! It's free. You can head to the Facebook page to join or come visit us at our stall and say hi to the execs. We'll be there Wednesday to Friday 9am-4pm
2. We have PhySoc shirts for sale, a chance to show you're a physicist! The new ones (pictured below) are \$10 but also come ask about our shirts from last year.
3. We recommend joining our friends (even if it's not your major) at BioSoc and ChemSoc who host a pretty mean BBQ and are our rivals in the interscience trivia night events we co-host. SUMS, the mathematics society, hold weekly guest lecturers on interesting maths topics along with free pizza and regular maths competitions. Finally, SciSoc, they hold the biggest events every year including the annual ball, harbour cruise and networking night.
4. There's plenty of W-week events at which are great chances to meet new likeminded (and some not so likeminded) people.
5. For first years and those new here, W-week is a good opportunity to look at your timetable and figure out where your classes are, to save you from getting too lost when class starts next week.

—Cameron



NEW (UNI) YEAR, NEW ME

1. I will attend lectures and tutorials.
2. I will keep my logbook up to date.
3. I won't spend all my money on coffee and food at Ralphs.
4. I will microwave soup and smelly fish in nanoscience microwave.
5. I will find good lab partner.
6. I will actually study at nanoscience.
7. I will actually study.
8. I will attend PhySoc events.
9. I will not approximate gravitational acceleration to 10ms^{-2} (or $\pi = 3$).
10. I will not make mathematicians cry.
11. I will not bully engineers.
12. I will take nanoscience stairs instead of the lift.
13. I will not get lost in physics building.

— Sam

Jeremy's Advice

Are you a new physics student at the University of Sydney? Well, you're in for an exciting and enriching journey! This is a survival guide to help you enjoy and make the most of your first year studying physics at the University of Sydney.

Q) What's the difference between lectures, tutorials and laboratories?

A) **Lectures** are where you learn physics course content. Attendance is not compulsory, but highly recommended. Lectures are recorded and posted on Canvas, but quality may vary between units.

Tutorials are where you apply the knowledge gained from lectures in exam-style questions. Tutorial attendance counts towards your final grade but is not compulsory to pass the course.

Labs are where you will work in groups to conduct experiments. You will need to attend a certain number of laboratory classes to pass the course and a few more to get higher grades.

Q) Can I study physics if I didn't study it in high school?

A) Yes! You can study PHYS1002 – Physics 1A (Fundamental).

Q) What is SSP physics?

A) The main difference between the SSP and other streams lies in the lab work: SSP students complete a few experiments and then complete research projects.

Q) What resources can I use for help?

A) Your unit outline on Canvas has what is covered in your course and when assessments are due. There will be online forums open for you to ask any questions to your lecturers and peers as well as asking them in class.

The prescribed textbook is super helpful for understanding lecture content. Second hand copies and e-books are usually cheaper than new ones. If, you don't want to purchase the textbook, you can find it (older editions are equally as useful) and similar titles at USYD's library.

Q) Who do I talk to if there's questions Jeremy didn't answer?

A) For any general questions about the course, you can contact the First Year Coordinator, A/Prof Helen Johnston at h.johnston@sydney.edu.au. For help with the tutorials or labs, you can talk to the Laboratory and Tutorial coordinator, Prof Manjula Sharma at manjula.sharma@sydney.edu.au. The Physics Student Services reception is at room A10, level 2 of the Physics Building (A28) (or email them at physics.studentservices@sydney.edu.au) for any general enquiries about studying physics at USYD.

