



*Extraterrestrial
Powered
Flight
- What a drag*

*Times Physics
was a B******

*Isolation
Alphabet*

What's Back on in PhySoc

Hi Everyone,

I hope you're all doing well.

The ongoing COVID-19 Pandemic has led to big changes, including social distancing and online learning, to which we have all had to adapt. PhySoc is no exception, and as such, we have begun to hold events over Zoom. The first of these was our PhySoc Trivia Night last Saturday. We also held our first Zoom talk on Tuesday: Neuromorphic Nanotechnology by Prof. Zdenka Kuncic. We wanted to give our heartfelt thanks to everyone who "attended" these events: in these uncertain times, it is your help that keeps PhySoc a successful society. We'll be holding more online events in the weeks to come, including a games night tentatively scheduled for the end of next week. Our hope is that these events will help minimise feelings of isolation.

We hope to see you soon, online.

Stay safe, and take care,

Justin

ISOLATION ALPHABET

The A-Z of What to do in Isolation

Arrange things - the files on your computer, your camera roll, your room!

Books! Check out works by Kurt Vonnegut, H.G. Wells, Ray Bradbury, Liu Cixin, Douglas Adams, Arthur C Clarke, and George Orwell. There are also some great science non-fiction books to read! Check out works by Stephen Hawking, Brian Greene, Carlo Rovelli, Yuval Noah Harari, Sean M. Carroll, Michio Kaku and Neil deGrasse Tyson.



Cook something! Look up recipes for dishes from different cultures, follow a YouTube tutorial or experiment!



Documentaries!

Exercise! There are a lot of good routines to follow on YouTube!

Find new music and make some playlists!

Games! Pick up those jigsaw puzzles, board and card games!

Hobbies! Do you play an instrument? Chess? Do you write? Do you like to draw or bake or dabble with circuitry? Now's a great time to get back into it!

Check out MadFit's Youtube channel for workouts to music or Nike Training Club for some intervals. There's societies doing zoom workouts if you don't want to do it alone!

Improve a skill, or learn a new one!

Join an online community! PhySoc's got a Discord server: <https://discord.gg/yvmDHGZ!>

Karaoke!

Listen to a TED-Talk!

Make a list of things you'll do once you're *not* locked away.

Some online games to play with friends!

- Spyfall
- Scibbl.io
- Codenames
- Battleships
- Monopoly

New languages! (Just don't let the Duolingo owl down...)



Online courses! There are many free courses available online for many areas of study!

Podcasts! There are A LOT of news, crime, comedy, educational and lifestyle podcasts you can check out!

Quizzes! There are some hilarious ones on BuzzFeed.

Research things that come to mind - mysteries, politics, science, history, current affairs, conspiracy theories or even myths and legends!

Sci-fi films! Check out Interstellar (2014), 2001: A Space Odyssey (1968), The Martian (2015), Blade Runner 2049 (2017), Alien (1977), Blade Runner (1982), Edge of Tomorrow (2014), Ex Machina (2014), Close Encounters of the Third Kind (1977), Invasion of the Body Snatchers (1956), Metropolis (1927) and Forbidden Planet (1956)!

Here's some top virtual museum tours:

<https://www.goodhousekeeping.com/life/travel/a31784720/best-virtual-tours/>

Taronga zoo has a live feed of some of its animals if museums aren't your thing:

<https://taronga.org.au/taronga-tv>

Take some time off... just RELAX!

Update your resume and cover letter!

Virtual museum tours!

Watch your lectures!!!!!!!!!!

X-box? Playstation? Nintendo Switch? PC? Get 'em up and running for some video gaming!

YouTube!

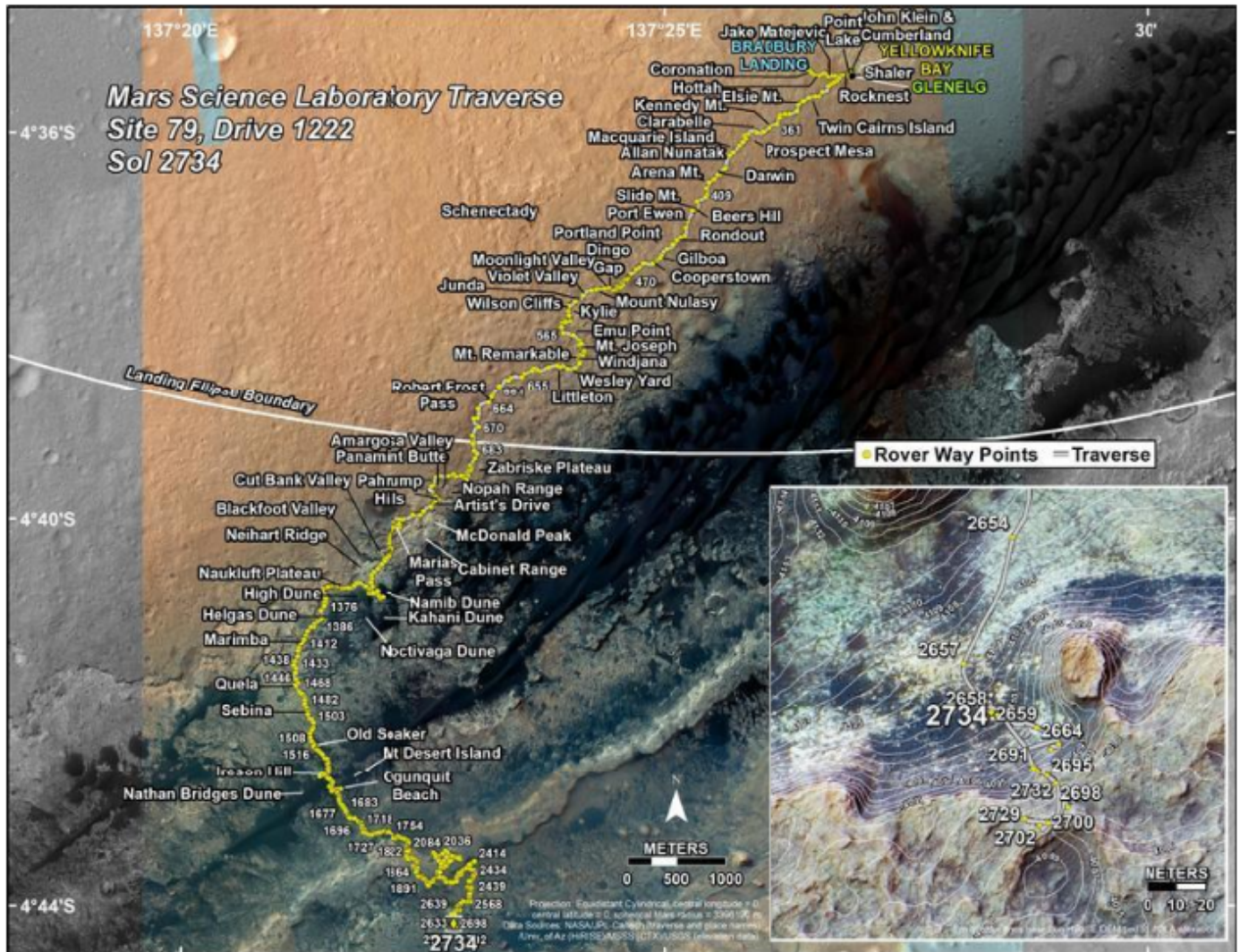
Zoom PhySoc and other society events; there are many more soon to come!

What about watching Netflix?

- Lauren

Extraterrestrial Powered Flight

- What a drag



Route driven by the Curiosity Rover over the 2734th day of its mission (Earth date: 15th April 2020)

Taken from: NASA's Mars Exploration Program. 2020. Where Is Curiosity? | Mission – NASA'S Mars Exploration Program. [online]
Available at: <https://mars.nasa.gov/msl/mission/where-is-the-rover/?page=0&per_page=25&order=sol+desc&search=&category=176%3A295&url_suffix=%3Fsite%3Dmsl> [Accessed 21 April 2020].

Getting around on Mars is slow. Real slow. The Curiosity rover has a blistering top speed of around 1 kilometre per 7 hours, fast enough to circumnavigate Mars in around 17 years. In the 8 years that it has been in operation, you'd expect that it was almost halfway around, to within at least an order of magnitude. So when it turns out it has only travelled a total of 22 kilometres, [1] what gives?

This is a result of a rover's greatest struggle in traversing a foreign planet's surface - pathfinding. Unknown terrain, large hills and craters are all a problem when there is nobody around to get a wheel unstuck or flip the rover back over, and so it must take extra care when deciding on the best route to take. The relatively short stature of a rover also means that it is difficult to identify points of interest beyond the immediate vicinity.

[1] Where is Curiosity?, Mars Exploration Program, mars.nasa.gov

[2] Rhett Allain, *The Physics of NASA's New Mars Helicopter*, WIRED

[3] Yang Gao, *Review on Space Robotics: Towards Top-Level Science through Space Exploration*, Jet Propulsion Laboratory

[4] DC Agle, *Mars Helicopter to Fly on NASA's Next Red Planet Rover Mission*, NASA 2018

It might seem practical to use satellite imagery of Mars to determine a path for a rover to follow, however this is not always feasible; the resolution of the images taken from orbit is not fine enough to identify small hazards which may complicate the journey. In order to capture the required detail, the camera needs to be much closer to the surface, yet high enough up so that it can survey the surrounding area. So far, the current rovers have relied on their own navigation cameras, taking baby steps before once again reevaluating their route.

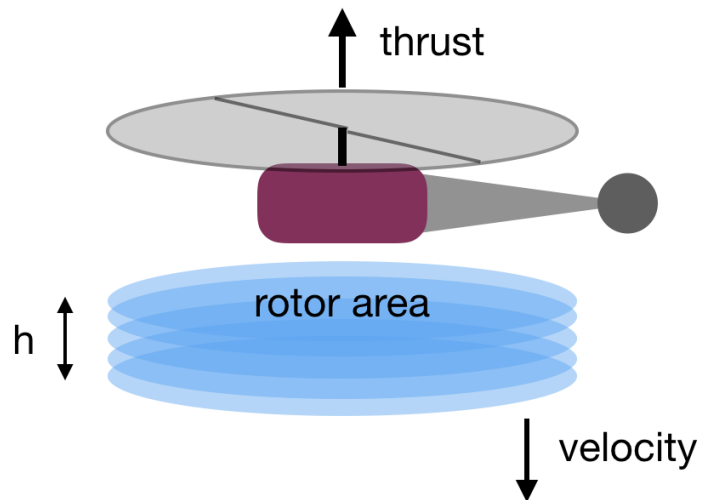
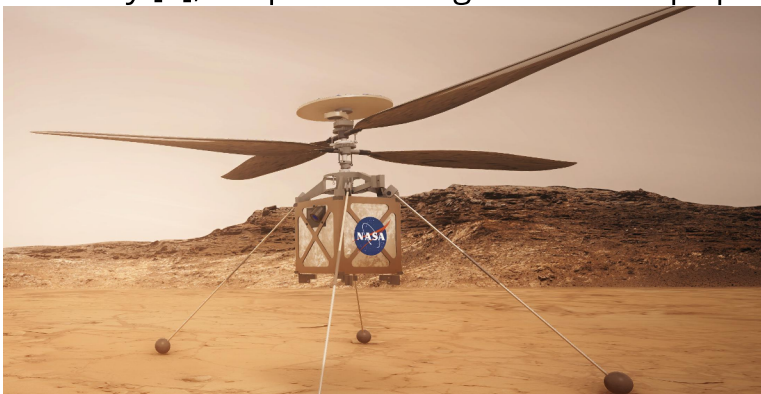


Diagram depicting the physics of the rover
 Taken from: Allain, R., 2020. *The Physics Of NASA's New Mars Helicopter*.
 [online] Wired. Available at:
 <<https://www.wired.com/story/the-physics-of-nasas-new-mars-helicopter/>>
 [Accessed 21 April 2020].

NASA hopes to improve upon this in their Mars 2020 mission using... a helicopter. Yes, a helicopter, in the Martian atmosphere. How does NASA think they can fly a helicopter in an atmosphere which is 100 times less dense than Earth's? The key is its weight. The Mars Helicopter has a mass of 1.8 kg, which will weigh just under 7 N on the surface of Mars. This was achieved by giving it a tiny battery capacity, no larger than a modern smartphone [2]. This limits it to a flight time of around three minutes, however this is more than enough to scout for its accompanying Perseverance rover. It is estimated that this would allow it to travel up to three times as far per day when compared to Curiosity [3], despite it having the same top speed.



The Mars Helicopter
 En.wikipedia.org. 2020. *Mars Helicopter*. [online] Available at:
 <https://en.wikipedia.org/wiki/Mars_Helicopter> [Accessed 21 April 2020].

The Mars Helicopter is not expected to be a large part of the 2020 mission. It will fly maybe five times [4], each time providing information to the team on Earth about potential routes. Its main objective is to serve as a valuable technical demonstration, so that NASA can evaluate the feasibility of using a helicopter on extraterrestrial bodies.

If it proves successful, it will represent the next step forward for planetary exploration. A helicopter could more easily traverse ice, water and other liquid bodies such as the methane lakes on Titan, where it can take more detailed photos and precise measurements in locations a rover could never reach. NASA has also made proposals for other airborne science payloads, such as a blimp for those bodies with denser atmospheres, which may ultimately play a similar role.

The Mars Helicopter will launch this June, accompanying its Perseverance rover. It is expected to begin operation in February 2021

- Hamish

[← Messages](#)**Physics**[Details](#)

When have I been a
b****?

When you stopped quantum mechanics and
special relativity from getting along

When you keep giving different answers for the
same question (I mean, talk about mixed signals!)

Exams.

One physics subject has more contact hours than a
humanities student's entire load

When you make us use MATLAB. With indexing
starting at 1

When you lead me to integrals that aren't trivial

You mean I have to use the desks in the physics
building LTs

Papers swap symbols for no reason!

Then, all of a sudden, two values have the same
symbol!

When energy eigenstates are labelled with the
same symbol as their eigenvalues

When you leave exercises to the reader

k