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**This is a graded discussion: 10 points possible**[Show Due Dates](#)**Z13 Zoom Chat with Scientist/Alumni, 7pm Wed April 20****Erin O'Connor**

Apr 14 at 9:09am

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Extra credit will be awarded to those who can attend live.**Zoom Chat with Scientist / Alumni, Wed April 20 at 7 pm (Extra Credit if you attend LIVE)****We had a great Zoom Meeting. Here is the recording:****<https://youtu.be/ITm4Wc8J4oM> <https://youtu.be/ITm4Wc8J4oM>**

- Jatila Van der Veen has for the past 30 years been involved with cosmology research, has spearheaded numerous science education projects, and has taught astronomy for UCSB and SBCC. More recently she has been working with several exciting projects. One involves propelling small, 10-gram or less, wafer-sized satellites (wafersats) out of the Solar System using coherent beams of directed energy. The destination is our nearest neighbor, the Alpha Centauri System, around 4.2 light years away. One of our ideas was to send tiny critters – the nematode *C. elegans* and the tardigrades *H. dujardini*, out of the solar system on these wafersats. She has also been working with a group at UCSB working on lunar surface operations, in particular dust mitigation. As NASA prepares to send the first crew back to the Moon in 2024-25, one of the biggest challenges is how to reduce the dangers of the lunar regolith – the surface dust, churned up by billions of years of bombardment by large and microscopic meteorites. Please join us live to ask questions about these amazing projects. For Jatila's full bio, **[click here](#)**

<http://www.fieldstudy.com/Courses/Earth106BlackHoles/OnLineMaterials/JatilaBio.html>.

Each week we will set up a Zoom chat with a scientist working with astronomy, astrophysics, cosmology, or science and engineering, or an alum of SBCC from our astronomy program to see what they are doing now with school, education, or their lives and careers. Some of our former students are doing amazing things. I will be reaching out to contacts I've made over my teaching career so that we can personalize and humanize the material and create more of an "in person" classroom environment.

These Zoom chats are optional. You are not required to attend, but you are certainly invited. These meetings will be at random various times during the week, subject to the availability of our prestigious guests. The meetings are not lectures. I'm more interested in chatting with our guests to have them tell you a bit about their school, work, and interest in astronomy and to give you an opportunity to ask questions and interact with them yourselves.

If you can not attend, that is fine, you will still get full credit by watching the recording and participating in a discussion about the Zoom meeting.

After participating in the Zoom Chat and/or watching a recording of the Zoom Chat, please post your reaction to the meeting. What did you find most interesting about what they are doing or what they had to say? How is it relevant to your life or educational pursuits? What qualities about their approach or perspective to education (or life) do you think has helped them succeed and to get to a place where a Black Holes Class teacher would want to invite them for a Zoom Meeting with their class (haha).

<https://>**Sarah Savage** (<https://canvas.sbccc.edu/courses/46681/users/375381>)

Apr 20, 2022



Wow, both of the projects that Dr. Van der Veen presented seem like pretty futuristic stuff! Sending animals into space and also making the moon more livable both feel like the next steps we humans need in order to venture off of Earth with the purpose of expanding our civilization.

Listening to the scope of these projects, I can't help but think of the potential ethical considerations that she didn't really address. SHOULD we be doing these things? Do we have the RIGHT to do them? And WHO is both thinking about the potentially negative impacts and regulating them?

On Earth, we have many expanses of land that are legally protected by the country they lie in, and species of plants and animals living on those lands are also protected. Who is protecting the moon? It's currently land that is nearly untouched, and the marks we've already made there will last indefinitely (flags planted, footprints, have we left trash?). Converting the top layer of the moon's regolith into a solid makes it safer and easier for humans to be there, but it's also permanently converting a pristine landscape. Should it be a protected land the way our national parks are protected?

Someone in the zoom call did bring up the concern about tardigrades and nematodes "infecting" and endangering whatever life it encounters. There have been plenty of instances where humans have introduced a creature to a land for a functional purpose and have ended up decimating populations of other species. I'm specifically thinking of how wild pigs were

introduced to the Channel Islands in the to control the rat population, which, as the main food source of the Channel Islands Fox, effectively made the fox an endangered species. It sounds like the laser experiment expects that the creatures we send will burn up upon entry into a planet's atmosphere, but what if the wafersat is intercepted by a comet or even an alien civilization traveling in space who capture it and bring it home with them.

What are your thoughts?

← [Reply](#)



Sarah Savage (<https://canvas.sbccc.edu/courses/46681/users/375381>)

Apr 23, 2022

I got the Channel Islands story wrong, sorry! But it's the same concept. In the 1800s, farmers left pigs on the islands, which became feral and over-reproduced, which attracted golden eagles, who took out so much of the fox population that it became endangered. It's now bouncing back after the government had to eradicate the pigs (which were also destroying native plants and Chumash archaeological sites). <https://www.nps.gov/chis/learn/news/feral-pig-eradication-begins-on-santa-cruz-island.htm> (<https://www.nps.gov/chis/learn/news/feral-pig-eradication-begins-on-santa-cruz-island.htm>)

← [Reply](#)



Erin O'Connor (<https://canvas.sbccc.edu/courses/46681/users/24247>)

May 1, 2022

Isn't that an interesting and complex story about the pigs, eagles, and foxes out on the Channel Islands.

← [Reply](#)



Erin O'Connor (<https://canvas.sbccc.edu/courses/46681/users/24247>)

May 1, 2022

You draw attention to very significant and valid concerns. Just like we now have a field of bioethics regarding the ethics of advanced biological medicines and interventions, there is also the ethics of space, and especially as they relate to infecting other planetary surfaces with life from Earth. These are grand concerns of course. The probability of actually having one of these microorganisms survive and land on an alien planet and survive is very minute, but that doesn't mean that we as humans shouldn't take responsibility and do what we can to minimize such possible contamination. Then again, there are others who

feel that humans should spread our seed. Our sun will eventually die and our Earth will be uninhabitable. Are we to die out with our star or are we to try and disseminate our form of life. You could then take the argument in two different directions. If we are to disseminate life, should it be only intelligent complex multicellular advanced life like humans, or these small microorganisms, with perhaps the idea of terraforming planetary surfaces. So much to discuss and I won't say much here at this time, other than to draw your attention to these topics and to highlight the significance and importance of deep and thoughtful discussion.

← [Reply](#)



[https://](https://canvas.sbcc.edu/courses/46681/users/427388) **Malcolm Tircuit** (<https://canvas.sbcc.edu/courses/46681/users/427388>)

Apr 23, 2022

It was really interesting hearing Jatila talk about sending organisms to Alpha Centauri. I had no idea how long the distance between our solar system and Alpha Centauri was. Hearing how they plan to accelerate the craft was also very interesting. The whole process seems very difficult but then again, we only learned to fly just over 100 years ago. Maybe in the next 100 years, we will achieve things that we can't even dream of. Even the thought of getting beings from earth to other galaxies is so exciting. It kind of feels like maybe we will be able to leave our mark on the universe even if we die out. It's also weird to think that maybe life on earth originated from somewhere else. It's kind of crazy that we might have to consider that as an actual possibility.

← [Reply](#)



[http](http://canvas.sbcc.edu/courses/46681/users/24247) **Erin O'Connor** (<https://canvas.sbcc.edu/courses/46681/users/24247>)

May 1, 2022

Well said! So much has changed in a hundred years, that perhaps in the thousands of years to come, unimaginable things can become reality! Going to another plane is formidable, to another star system is seemingly impossible, but other galaxies, even our sci fi movies don't do that. All of Star Trek is in just ONE galaxy, our Milky Way.

← [Reply](#)



[https://](https://canvas.sbcc.edu/courses/46681/users/416476) **Victor Jensen** (<https://canvas.sbcc.edu/courses/46681/users/416476>)

Apr 24, 2022

Relating to the logarithmic map, here's something interesting:

SWEDEN SOLAR SYSTEM

www.swedensolarsystem.se



It's the largest solar system model on Earth, and is to-scale. The first image is the Sun (also the largest spherical building on Earth), then the Earth (the moon is also present, but is fairly far away. Every planet in the solar system can be lined up between the Earth and Moon), and finally Uranus (of course it has all the planets, but I do not want to show all of them).

This Zoom also very much so felt like a proper sequel to the other Zoom on the palm-sized interstellar probes.

A note on the extra credit Zoom meetings, I would attend, but they're typically during Wednesday afternoons are when I have a Oxyacetylene Welding course.

Edited by [Victor Jensen \(https://canvas.sbccc.edu/courses/46681/users/416476\)](https://canvas.sbccc.edu/courses/46681/users/416476) on Apr 24 at 9:21pm

← Reply



Alak Fryt (He/Him) (<https://canvas.sbccc.edu/courses/46681/users/354278>)

Apr 24, 2022

What I found to be the most interesting about Professor Van der Veen's presentation was their method for launching their interstellar spacecrafts. I think that it's really interesting that these researchers have developed a method for using the momentum of light itself to propel these spacecrafts. By doing this they will be literally riding the light waves of space which I think is really cool.

[← Reply](#)



Erin O'Connor (<https://canvas.sbccc.edu/courses/46681/users/24247>)

May 1, 2022

Yes, the ideas are really straight out of science fiction. Now remember, these are proof-of-concept investigations, and they are building the wafer craft, but they don't have the lasers to propel them to a quarter of the speed of light, yet. But they are calculating the technology needed, how many lasers, what power they would have, whether they would be on the ground or in orbit, so that someday they could build this if they wanted to.

[← Reply](#)



Abigail Jacobs (She/Her) (<https://canvas.sbccc.edu/courses/46681/users/367167>)

Apr 24, 2022

On this week's zoom, Jatila Van der Veen talked to us about her work with cosmetology and her teachings in astronomy at UCSB. Her projects are amazing, and I also liked her questions in the beginning that I also wonder and they are questions that people not taking these classes can understand as they are general. I found the Interstellar Medium to be extremely fascinating because I have yet to see a chart like this that is beyond our solar system, these charts humble me as I remember how small we are! I also think again it's amazing to see another woman in STEM showing all other girls that we can do it if we want and we can work alongside men to break the stereotype that women are homemakers.

[← Reply](#)

**Erin O'Connor** (<https://canvas.sbccc.edu/courses/46681/users/24247>)

May 1, 2022



I'm glad you enjoyed Dr Van der Veen's presentation and found her as a great example of women in STEM. What's great about her is that she's been doing this for over 30 years. We worked together in the Experimental Cosmology Labs at UCSB in the early 1990s. A long time ago in a galaxy far far away. And not only does she enjoyed the research, but she is a tremendous educator and has worked on nationally funded projects to help disseminate the scientific knowledge to the General Public, colleges, and high schools.

[← Reply](#)**Brian Wolden** (<https://canvas.sbccc.edu/courses/46681/users/274832>)

Apr 24, 2022



It was great to hear from Dr. Van der Veen, particularly since she is also my EARTH 101 professor and I had no idea that she had worked on such exciting projects! The tardigrades were particularly interesting. I had heard of them and seen images before, as they sometimes make their way into pop culture, but I didn't know just how versatile and durable they are! Their ability to survive in, and revive from, a dehydrated state is really cool. Learning about this also added to the impressiveness of the project we first heard about from Dr. Lubin. To not only be able to get these thin circuit boards up to 25% the speed of light but also to place, and revive, small creatures on them is pretty crazy! It was also interesting to learn about the radiation they will have to endure as I hadn't thought of radiation in relativistic terms before. It makes perfect sense that you experience the same radiation whether it is the particle that is moving super fast or if some other object is moving into a particle super fast but I had never thought about it in those terms before.

[← Reply](#)**Erin O'Connor** (<https://canvas.sbccc.edu/courses/46681/users/24247>)

May 1, 2022



Yes, that's why this proof-of-concept research project is important. We may not actually be able to implement this anytime soon, but thinking about the radiation effects, seeing if we can miniaturize a wafer craft and have it reliably work, designing and calculating the number of lasers and their power and thinking of how we would construct a bank of lasers and have them focused properly and work correctly, these are all challenging technological efforts.

 [Reply](#)**Franco Diaz Campo** (<https://canvas.sbccc.edu/courses/46681/users/403036>)

Apr 25, 2022

Hi everyone,

First of all I want to thank Professor O'Connor for bringing us such a nice meeting. I really enjoyed it, and it was one of the meetings that I've enjoyed most, and it was anything but boring, on the contrary, it was very entertaining. I think the way Jatila Van der Veen expresses herself was unique. She said so much information that anyone could think that it was very confusing, but the reality is that everything was very organized, and the information was perfectly given. I have to say that cosmology is one of my favorite parts of physics, and by hearing her talk about it with so much passion, it helped me having a better understanding of the topic, and that is why I liked so much this meeting.

I hope we can continue having meetings like people like her, I think that when someone has too much passion for physics (or any topic), you could spend hours and hours hearing them and asking questions. And the fact that she was talking about cosmology, it made me want to hear more about it.

 [Reply](#)**Erin O'Connor** (<https://canvas.sbccc.edu/courses/46681/users/24247>)

May 1, 2022

I'm glad to hear you enjoyed hearing the work that Dr Van der Veen is doing. She worked for many years in cosmology, but she talked a lot in this Zoom Chat about this special project to build small tiny wafer spacecraft that will be propelled to a quarter of the speed of light with lasers and travel to the nearest star Alpha Centauri within 25 years. And she talked about having small single-celled organisms on the wafer crafts and seeing if they can survive the journey. If you missed that, you should go back and listen again because that was a very interesting part of her presentation.

 [Reply](#)**Naomi Xu** (<https://canvas.sbccc.edu/courses/46681/users/27955>)

Tuesday

I watched the entire time with my jaw on the floor. What's so amazing to me is just all the different ways we've been able to come up with to further explore space. Humans can't withstand the circumstances? No worries let's send microbes. Space crafts and fuels aren't efficient enough? Lasers have momentum. All the rovers we've sent out, even the star shade, the examples are endless, and I guess I really just am in awe of our creativity.

← Reply

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Erin O'Connor (<https://canvas.sbccc.edu/courses/46681/users/24247>)



Wednesday

Yes! Wow! It's amazing what we humans are doing. There is so much potential to do so much more!

← Reply

