

Topical Seminar – Friday, February 21<sup>st</sup> at 1:30 pm in the Lewes Library

Hi All, the subject of the next Topical Seminar is “Space”. Vicki Nichols will lead the seminar where we will be discussing the social, legal, environmental, commercial and military consequences - as well as opportunities - of both near and deep space travel. What follows is Vicki’s description of the seminar discussion and the readings needed in preparation of the seminar. Several documents are attached to this email. Other documents are available on-line. Don’t forget to think about the questions she raises for discussion. As is our practice, feel free to bring along other materials and questions to add to the discussion. Aram and David

**Vicki;** I have identified information concerning all aspects of our discussion so that we have a clear and all-encompassing vision of what “space” means to us as we move into a new age of commercialization, privatization and militarization of both Lower Earth Orbit and interplanetary and intergalactic space. The primary topics of the readings and discussion questions cover:

- Space law – ownership, exploitation of resources, colonization
- Space security and the militarization of space
- Environmental concerns about space launches and space debris/junk on earth and in earth orbit

In addition to the articles attached to this email, please see the **list of articles below**, try to definitely read the ones that are starred (\*\*\*) .

**\*\*\*Is It Worth It? The Costs and Benefits of Space Exploration:** *By Matthew S. Williams. Interesting Engineering. April 17, 2019. A good introduction.*

<https://interestingengineering.com/is-it-worth-it-the-costs-and-benefits-of-space-exploration>

**A Lawmaker’s Guide to The Galaxy.** *By Alex Moersen. InnoTechToday. February 5th, 2018* Brief summary of the development of the Outer Space Treaty and how space expansion and private and commercial sector engagement has changed the discussion. <https://innotechtoday.com/outer-space-law/>

**Outer Space Treaty.** *United Nations Office for Outer Space Affairs.* A one-page summary of the basic principles of the 1967 treaty <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html>

**\*\*\*Space Law must be respected, upheld and strengthened (PDF)** –*Speech by Bruce K. Gagnon, Coordinator, Global Network Against Weapons & Nuclear Power in Space at the International Conference on Super Powers' Dominion in Outer Space & Global Sustainable Development. A GN & Damodaram Sanjivaya National Law University Conference in Visakhapatnam, Andhra Pradesh, India, 12-13 October 2019. (article attached to this email)*

**\*\*\*Is Spaceflight Colonialism? Fifty years after Apollo 11, it's time to revisit the laws of space. (PDF)** By Haris Durrani. The Nation. July 19, 2019 (**article attached to this email**), or if you have Nation account at <https://www.thenation.com/article/archive/apollo-space-lunar-rockets-colonialism/>

**Mining in Space: What It Means for the Economy?** The pros, the cons, the challenges, the scope, and the economy! By *Kashyap Vyas*. January 02, 2019. *Interesting Engineering*. <https://interestingengineering.com/mining-in-space-what-it-means-for-the-economy>

**Time to clear the air about launch pollution.** Op-ed by [Martin Ross](#) and [James Vedda](#). *Space News*. July 3, 2018. With global launches on the rise, we need an objective basis for discussing rocket emissions.

<https://spacenews.com/op-ed-time-to-clear-the-air-about-launch-pollution>

**Space debris.** *Nasa Headquarters Library*. Brief summary of the issue of Low Earth Orbit space junk. "The space around our planet is filled with rubbish. It's time to take out the trash!" [https://www.nasa.gov/centers/hq/library/find/bibliographies/space\\_debris](https://www.nasa.gov/centers/hq/library/find/bibliographies/space_debris)

**\*\*\*Trump's Excellent Space Force Adventure:** You laugh — but his proposal for a new military branch really could make America safe again. By [David Montgomery](#). *Washington Post Magazine*. December 3, 2019.

<https://www.washingtonpost.com/magazine/2019/12/03/trumps-proposal-space-force-was-widely-mocked-could-it-be-stroke-stable-genius-that-makes-america-safe-again/?arc404=true>

## **USEFUL BOOKS AVAILABLE THROUGH THE DELAWARE LIBRARY SYSTEM**

**The consequential frontier : challenging the privatization of space** / Peter Ward. Brooklyn and London : Melville House, 2019.

SUMMARY: With SpaceX and Virgin Galactic both significantly expanding their space programs this year, commercial space travel looks set to dominate the headlines for the foreseeable future. As this new space race dawns, start-up companies are readying their engines to head into the cosmos for the sake of privatization and profit. Journalist Peter Ward investigates how such endeavors could lead not to a new golden age, but a new era of colonialism.

**The case for space : how the revolution in spaceflight opens up a future of limitless possibility** / Robert Zubrin. Amherst, NY : Prometheus Books, 2019.

**SUMMARY:** A noted space expert explains the current revolution in spaceflight, where it leads, and why we need it. A new space race has begun. But the rivals in this case are not superpowers but competing entrepreneurs. These daring pioneers are creating a revolution in spaceflight that promises to transform the near future. Astronautical engineer Robert Zubrin spells out the potential of these new developments in an engrossing narrative that is visionary yet grounded by a deep understanding of the practical challenges.

**The future of humanity : terraforming Mars, interstellar travel, immortality, and our destiny beyond Earth** / Michio Kaku. 1<sup>st</sup> ed. New York : Doubleday, 2018.

**SUMMARY:** World-renowned physicist and futurist Michio Kaku explores in rich, intimate detail the process by which humanity may gradually move away from the planet and develop a sustainable civilization in outer space. He reveals how cutting-edge developments in robotics, nanotechnology, and biotechnology may allow us to terraform and build habitable cities on Mars. He then takes us beyond the solar system to nearby stars, which may soon be reached by nanoships traveling on laser beams at near the speed of light. Finally, he brings us beyond our galaxy, and even beyond our universe, to the possibility of immortality, showing us how humans may someday be able to leave our bodies entirely and laser port to new havens in space. With irrepressible enthusiasm and wonder, Dr. Kaku takes readers on a fascinating journey to a future in which humanity may finally fulfill its long-awaited destiny among the stars"-- Provided by publisher.

#### **Other interesting links:**

##### **NASA Spin-off technology**

list: [https://spinoff.nasa.gov/Spinoff2008/tech\\_benefits.html](https://spinoff.nasa.gov/Spinoff2008/tech_benefits.html)

##### **Outer Space**

Treaty <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html>

##### **Astromaterials Research & Exploration Science, Orbital Debris Program**

Office <https://orbitaldebris.jsc.nasa.gov/>

### **Discussion Questions for this Seminar**

1. Who "owns" space? Is it ownable? Does whoever gets to an asteroid first get to mine it for precious metals? Even if we cannot claim any part of the moon as territory, under the OST, will we act as if we do own it? Who will private corporations pay for the rights they want? Should we put policies and policing mechanisms in place now in advance of growing commercial and industrial presence in space?

2. Should we weaponize space? Space technology is already essential for just about all military purposes here on earth. The OST prohibits nuclear weapons or other WMDs in space. Should the US accept the PAROS treaty banning all weapons in space?
  
3. Should we care about damaging or contaminating non-hospitable space environments? Who will decide what should be protected and how? Should we clean up our space junk? The OST says “states shall avoid harmful contamination of space and celestial bodies.”
  
4. (If time permits) Is space travel the savior of the planet? Is it an enormous risk to think that if Earth is ruined by global warming and other problems, that we can live happily on another planet?