



American Institute of Aeronautics and Astronautics  
Los Angeles - Las Vegas Section

# Newsletter

## December 2019

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## Advanced Space Propulsion Concepts for Interstellar Travel (25 September, 2019)

by Bill Kelly



*Left Standing – Greg Meholic, the event speaker on September 25 in the Palos Verdes Peninsula Center Library. Photo courtesy of Ken Lui*

The word heard most often in the audience was “excellent” after Greg Meholic gave his lecture entitled “Advanced Space Concepts for Interstellar Travel” at the Peninsula Center Library during the evening of September 25<sup>th</sup>. The lecture’s stated purpose was to “provide a high level, “evolutionary”, information-only overview of various propulsion technology

concepts that, with sufficient development (i.e. \$) may lead mankind to the stars”. It achieved its purpose . . . and then some.

Most of us in the audience were familiar with the basic technology of rocket propulsion which Greg touched on briefly. That given as a base, Greg led us to the paradigm shift in technology required to even consider interstellar travel. Distance has to be measured in light-years. In order to reach Tau Ceti (12 light-years away) in 40 years, we need to travel at 30% of the speed of light (202.5 million miles per hour). The Voyager 1 spacecraft is one of the fastest man-made objects ever launched and it’s only going 38,120 miles per hour.

Also known to most of the audience, chemical combustion systems are not viable for interstellar missions. Greg quantified this as follows: Regardless of reactants, the chemical propellant mass required to reach Alpha Centauri (4.2 light-years away) in 900 years exceeds the mass of the known universe. Nuclear fission, fusion and anti-matter annihilation are much more efficient than chemical combustion but still not good enough for interstellar travel within a human lifetime.

*(continued on page 7)*

*(More photos on [bit.ly/2YNdMu2](http://bit.ly/2YNdMu2) , [bit.ly/2YKdWIM](http://bit.ly/2YKdWIM) , [bit.ly/38CNFdQ](http://bit.ly/38CNFdQ))*



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## Professionals Networking in the Proud Bird on 4 November, 2019

by Mallorie Vanghel

AIAA LA-LV's monthly networking event was held the evening of Monday November 4, 2019 at The Proud Bird restaurant in Los Angeles, CA. Attendees enjoyed views of planes landing nearby at LAX airport while enjoying catered hors d'oeuvres and pizza. The business casual networking event provides a great opportunity for professionals, in a fun atmosphere.

A brief introduction was made by volunteer and member, Mallorie Vanghel, where she highlighted November's theme of Women in Aerospace, and promoted the Women's Breakfast, as well as other events.

She then introduced members and aerospace engineers, Diana DiDomenico and Serena Quach, to say a few words about their work and personal experiences. Both women had great insight into their journeys to success.

Diana spoke about her 40 year career in aerospace, her positive experiences, and how thankful she was to receive money for projects. She recognized how much she was able to do and to paraphrase Diana, she says she "never felt a glass ceiling."

A current Northrop Grumman employee, Serena told a very inspiring story about being the eldest of 3 children, and making her own toys at a young age. Graduating at the top of her class, Serena currently works in aerospace and is a member that certainly inspires us!

Captivating attendees with their awe-inspiring stories, having the ladies share their words was a great suggestion from Section Chair, Dr. Chandrashekar Sonwane.

With dozens of people in attendance, we saw many familiar faces, as well as first timers that AIAA was happy and eager to welcome.

Thank you to everyone who came to the event, and a special thank you to Marilyn, Vlad, and the volunteers. With all of your help and attendance, we had a successful networking event, and look forward to the next one!



Mallorie Vanghel

Article written by Mallorie Vanghel, current member and volunteer. Mallorie has a Bachelor's degree in Telecommunications and Film. Currently working in Hollywood, she is a writer and host for a news media outlet, PopFuzion TV. Her dream is to work on SpaceX or NASA's media team.



Left – Diana DiDomenico, Right – Serena Quach  
(Photo courtesy of Ken Lui) (More on [bit.ly/2PF5395](https://bit.ly/2PF5395))

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## Aerospace Women's Networking Breakfast on 17 November, 2019

by Marilyn L. McPoland

Will I be able to bring my pet? How will time be determined? Will there still be 24 hour days? Will space travelers be chosen based on professional skill set, or the ability to pay for a ticket? These, and more, inspiring questions were just some of the riveting dialogue that took place at the Women's Aerospace Breakfast on Sunday, November 17th at the Ocean View Cafe in Manhattan Beach.

On a stunningly gorgeous, unseasonably warm Sunday morning, approximately 35 aerospace enthusiasts shared their prospective, questions, and ideas on the future of personal space travel. Courtney Best and Serena Quach provided words of welcome and encouraged everyone to engage in meaningful conversation on ideas for living in space. An idea sheet was distributed with thought-provoking questions that lead to talks about possible monetary systems, how leadership might be determined, what kind of illnesses travelers might incur and the accessibility for healthcare treatment, what would entertainment look like, will there be internet accessibility, and countless other thoughts.

In addition to fascinating space travel conversation, important networking and professional advice was exchanged between working professionals and recent grads.

The two-hour breakfast conversation took place on the outside patio of the Ocean Cafe which presented a million dollar ocean view as attendees dined on a delightful breakfast of Belgian waffles, eggs and a medley of fresh fruits.



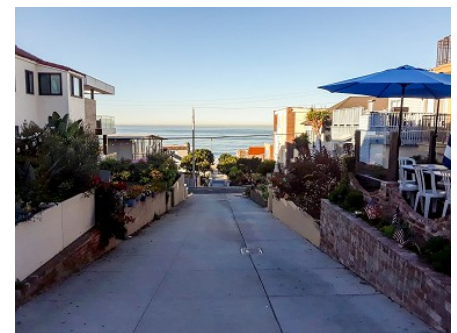
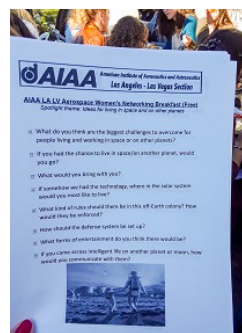
Left: Vlad Ionescu, Middle: Serena Quach, Right: Courtney Best (Photo courtesy of Mallorie Vanghel)



Attendees enjoying a sunny morning, and hot breakfast (Photo courtesy of Mallorie Vanghel)



Ms. Joan Horvath sharing her experiences (Photo courtesy of Mallorie Vanghel)  
(More Photos on [bit.ly/36wHuGi](http://bit.ly/36wHuGi))



Left: Living in Space worksheet, Right: Beautiful Beach View (Photo courtesy of Mallorie Vanghel)  
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# AIAA Los Angeles-Las Vegas Section Hosts JPL Fellow on Robotic Space Exploration: A Vision for Future of Robotic Space Exploration – the next 50 years, on 13 November, 2019

by Dr. David Sunderland

On November 13, Dr. Leon Alkalai, a 30 year veteran and Fellow of the Jet Propulsion Laboratory (JPL), gave a stimulating presentation on “A Vision for Future of Robotic Space Exploration – the next 50 years” at the Santa Monica Public Library.

Dr. Alkalai began with an introduction to JPL. Founded in 1936 (before NASA), it is a Federally Funded Research and Development Center (FFRDC). Administered by CalTech, it is the only NASA group not run by civil servants. 80% of their work comes from NASA (half competed with other NASA centers). For the rest, they welcome commercial investment, doing the work that industry can't. One quarter of JPL's \$2.7B business is in Earth Science. Unlike the ESA and CNES, which do their science at universities, JPL is considered a “science institution”. They have about 6500 employees, of which 40% are millennials. While this is slightly beyond the 5000 head considered optimum for the facility, they maintain a very open, campus-like atmosphere.

We next got a quick tour of on-going JPL robotic space missions, including some serious “acronym soup”. OCO-3 (Orbiting Carbon Observatory) and COSMIC-2A (constellation of 6 satellites for atmospheric measurements) were launching late this year. 2020 will see the Mars 2020 mission, including the Mars Helicopter. NISAR (NASA-ISRO Synthetic Aperture Radar) and SWOT (Surface Water and Ocean Topography) launch in 2021, Psyche/DSOC (to orbit a metal asteroid) in 2022, with Europa Clipper and SPHEREx (optical & near-infrared telescope) in 2023.

Dr. Alkalai became a JPL Fellow because of his success in winning competed missions, such as GRAIL (gravity mapping the Moon) and Mars InSight (the 8th successful Mars lander, studying Mars seismology). He is now responsible for JPL's Strategic Implementation Plan (available publically at <https://jpl.nasa.gov/sip>), which defines their 7 “Quests” (Earth Science, Mars Exploration, Solar System Exploration, Astronomy & Physics, Interplanetary Network, National

Challenges/Economic Growth, National Security), 3 “Thrusts” (Laboratory of the Future, Innovating Processes, Inspiring the World) and 12 desired “Future Capabilities” (see below).



*Dr. Leon Alkalai talking about the future NASA JPL Robotic Space Missions (Photo courtesy of Ken Lui)*

Reviewing the Thrusts in more detail, we heard about on-going plans, including missions to Europa, Titan, Enceladus, Venus, the Moon's South Pole, and various “small bodies”. A Mars Sample Return mission, recently approved, will require 2 launches. They are looking at ways to get to the Interstellar Medium much faster than Voyager (i.e. 6-10 years vs. 40), and would like to employ a Solar Gravity Lens at 1000 AU (140 light hours). For a Europa Lander, challenges include landing on an icy surface and planning a trajectory that avoids the worst radiation (the electronics will be in a “vault”).

The Future Capabilities list is quite extensive, including life detection, autonomy, small satellites (e.g. Ka-band radar Rain Cube), additive manufacturing, robotic assembly, “swarm” systems, in-situ science, high performance computing (both rad-hard and commercial), advanced detectors, quantum sensors & communication, augmented/virtual reality, and “big data” analytics.

*(continued on page 9)*

*(More Photos on [bit.ly/2RPx7sL](https://bit.ly/2RPx7sL), [bit.ly/2qLVzAf](https://bit.ly/2qLVzAf), [bit.ly/2slvl2l](https://bit.ly/2slvl2l))*



## To pour, or not to pour-over, that is the question: How to make a pour-over coffee on Mars?

by Jenwei Yeh

**Inspiration from AIAA event on 17 Aug 2019: "Space Architecture and Robotic Space Construction & Manufacturing" by Prof. Madhu Thangavelu, Prof. Boris Fritz, Melodie Yashar, and Dr. Behrokh Khoshnevis**



*Melodie Yashar talking about her NASA winning design: the Mars X-House (Photo courtesy of Ken Lui)*

On a Saturday in mid-August, I was ready for space travel with a towel. We were headed to Mars, the moon, and back to Earth. And then...it hit me. How can I make a pour-over coffee on Mars? Can one enjoy pour-over coffee on Mars? Indeed, how to brew a regular cup of Joe on the ISS had already been solved a couple of years ago, by devising a method of drip brewing coffee in zero gravity, but a pour-over is another matter. Failing to preserve our living standards is such a humiliation for any space colonizer. Watching hot water pour over ground coffee beans in the funnel, and drip into the cup is a visual, sensual pleasure. We must spread this elegant heritage to the station and any colonies we establish. Surely it will serve a purpose, helping us to forget that space can be full of risk, a dangerous, hostile environment, as we go about our journey in a tiny capsule, filled with radiation, on an infinite voyage. Pour-over coffee can be the much-needed elixir.

Today, Prof. Thangavelu and Prof. Fritz have brought us into outer space with additive manufacturing, which provides us with new industry products and manufacturing capabilities on our colonizing voyage. In these Earth years, we have seen the Fourth Industrial Revolution introduced by Klaus Schwab at the 2015 World Economic Forum. This revolution is merging technologies in fields such as robotics, AI, nanotech,

quantum computing, biotechnology, IoT, decentralization, 5G, and 3D printing. I'm sure the trends are also influencing the aerospace industry. Prof. Fritz presented several examples, and one which most interested me, was the wing structure covered by a pinhole-sized airpath. It can change the entire platform of the airplane. Just imagine the massive pinhole nozzles on the wing that provide more lift force than passive relay on airspeed, improving manipulations in low-speed conditions, or by controlling the airpath changing characteristics like the actuating flap or aileron. Or the structure behaves like a diffuser to decrease kinetic energy of the air entering. Or even make several Pulsejet/Ramjets in one construction. Let us stop here now, otherwise, I can't stop thinking about what future aircraft will look like.

Then, Melodie Yashar and Dr. Khoshnevis bring us to Mars then back to the moon. The finished part comes with Prof. Thangavelu providing a solution for more detail in the lava tube instead of the planet's surface. Leave the economics and politics aside, I want to enjoy my colonizer lifetime from moon station to Mars base first.



*Panel Discussion: From Left to Right: Prof. Boris Fritz, Ms. Melodie Yashar, Prof. Madhu Thangavelu, Dr. Behrokh Khoshnevis (Photo courtesy of Ken Lui)*

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(More Photos: [bit.ly/2LTp0Yr](http://bit.ly/2LTp0Yr), [bit.ly/2rAQueK](http://bit.ly/2rAQueK), [bit.ly/34jTYPY](http://bit.ly/34jTYPY))

## Exoplanets ! (on 21 August, 2019)

by Karen Grothe



Dr. Jessie Christiansen (Photo courtesy of Ken Lui)



Dr. Niraj K. Inamdar (Photo courtesy of Ken Lui)

On Wednesday, August 21, 2019, Dr. Jessie Christiansen and Dr. Niraj K. Inamdar presented about exoplanets to a packed room at the Manhattan Beach Library. Dr. Christiansen, a research scientist at Caltech/IPAC NASA Exoplanet Science Institute, started the evening with the rousing presentation “On the Road to a Billion Planets” about how many exoplanets have been discovered so far and how many more are anticipated to be discovered in the coming years. She pointed out that there are around 710,000 minor planets just in our solar system, a number which includes dwarf planets, asteroids, Trojans, comets and other small bodies. In her history of astronomy, she pointed out that in 1592, the Italian cosmologist Giordano Bruno said that “countless suns and countless Earths” exist, a belief for which he was later burned at the stake. His theory is proving true as more exoplanets are being discovered at an increasing rate since the first exoplanet was discovered in 1992. In 1952, Otto Struve proposed a technique to observe how fast stars are moving to find the ones being nudged by planets orbiting them. In 1995, the first planet, likely a hot, Jupiter-sized planet, was found using his method. Starting in 2010, the Kepler space telescope facilitated the confirmation of a wider variety of exoplanets, thus accelerating the pace of exoplanet discovery.

In 2016, Dr. Christiansen realized that the number of planets discovered was growing exponentially. She tweeted a plot asking if there is a Moore’s Law equivalent for exoplanets, and got a response from Eric Mamajek interpolating from a log plot that the number of exoplanets discovered was doubling every 27 months! (See Twitter conversation here: <https://twitter.com/aussiastronomer/status/790700485376348160>.) He predicted that the number of exoplanets discovered would hit a million in 2034 and a billion in 2057, thus the title of Dr. Christiansen’s presentation.

The number of exoplanets discovered was 3,944 as of April 2018, and none of them had been declared “Earth-like”. However, scientists have mistakenly been assuming that stars are relatively quiet like our Sun, but the truth is they are likely quite noisy. As scientists take noisy stars into account, they are discovering that Earth-like planets are quite common. Dr. Christiansen went over all the types of planets discovered so far: hot Jupiters that are close enough to their stars to be burning off atmosphere all the time, lava worlds like Kepler-10 which are tidally fixed in orbit and have a magma surface facing the star, rocky planets, ocean worlds, and ice giants. She pointed out that super-Earths have been the most common – rocky planets of a size between Earth and Neptune.

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(More Photos on [bit.ly/2PLx5zt](http://bit.ly/2PLx5zt), [bit.ly/2PGH7IK](http://bit.ly/2PGH7IK))

## Advanced Space Propulsion Concepts for Interstellar Travel (Sep. 25)

(continued from page 1)

by Bill Kelly



Greg Meholic talking about the Faster-Than-Light Advanced Propulsion Concept (Photo courtesy of Ken Lui)

The names of concepts which appear viable for human interstellar travel have exotic titles like Alcubierre Warp Drive, Traversable Worm Holes, Brane-Based Alcubierre, Trans-Space Faster-Than-Light Travel and Hyperspace In General Relativity. This part of the talk made everyone's head hurt. We had to think about special relativity with mass increase and time dilation, general relativity (Einstein's gravity), quantum mechanics, string theory (Branes), alternate space (subluminal, luminal, and superluminal) and dimensions beyond the comfortable 3 or 4 we all know.

It isn't possible to devote a fair amount of space in this summary article to each of the concepts Greg discussed with stunning clarity and humor in his 77 page presentation. I advise you to get a copy of Greg's presentation and give yourself a headache for science. It's worth it.

Obviously, the human race has a long way to go before we become the little green men on someone else's planet. But Greg leaves us with hope, evident in two references he makes in the presentation:

1 – New York Times, October 9, 1903 New York Times:

"[A] flying machine which will really fly might be evolved by the combined and continuous efforts of mathematicians and mechanics in from one million to ten million years."

2 – Orville Wright's Diary, October 9, 1903

"We started assembly today"

"The truth is out there." It may be hidden in someone's failed experiment right now, waiting for the moment of inspiration to hit a lowly lab technician who corrects a minor problem and reveals it.



Guido Frassinelli asking the speaker some questions (Photo courtesy of Ken Lui)

Bill Kelly is a Senior Member of AIAA recently retired from the Aerojet Rocketdyne Corporation after 19 years of service plus 26 more years at other aerospace (Marquardt, Vacco Industries, etc.) and power industry (Babcock and Wilcox) companies. He was recently elected Treasurer of the Los Angeles-Las Vegas Section of AIAA. His experience at Babcock and Wilcox includes system design and start-up testing of large steam boilers and nuclear reactors (Three Mile Island, etc.). His experience at Marquardt includes small rocket engine and ramjet testing (NASP, etc.) and naval weapons systems development. His experience at Aerojet Rocketdyne includes large rocket engine system engineering, assembly and testing (RS-84, J-2X, RS-25, etc.) and system engineering for the MMRTG (Multi Mission Radioisotope Thermoelectric Generator). He holds a BSME from New York University, a MSNE from the University of Virginia and a post-graduate certificate in Aeronautical and Astronautical Engineering from UCLA.



## Aerospace Women's Networking Breakfast on November 17, 2019

(continued from page 3)

by Marilyn L. McPoland



*Attendees enjoying casual and fun networking  
(Photo courtesy of Mallorie Vanghel)*

With over twenty years in aviation, both professionally and personally, Marilyn's background includes a wide variety of successes at producing never-been-done-before events such as:

The first XPRIZE Air & Space Expo at Holloman Air Force Base with both "fire & fly" activities - rocket launches, lunar lander vehicle competitions and air show performances.

The very first over-the-water airshow at the Huntington Beach Pier with a myriad of military and civilian performances including Bob Hoover, Wayne Handley, the Royal Canadian Air Force, and more.

Record-breaking air shows in Hawaii, with the U.S. Navy Blue Angels Jet Performance Team, which attracted more than 250,000 spectators.

Her professional career has piloted her into holding such positions as Senior Director of Operations for the XPRIZE Foundation, Director of Programs for the Museum of Flying in Santa Monica, Executive Producer for the Pierfest Sea and Air Show, and Marketing Director for U.S. Naval Air Station Barbers Point, HI

Throughout her career, she has had the great fortune to work closely with many distinguished aviators including Bob Hoover, Donald Douglas, Jr., Airshow Performers - Sean D. Tucker, and Wayne Handley, a myriad of

Astronauts including Buzz Aldrin and Gene Cernan, the Tuskegee Airmen, the WASPS, members of the original Flying Tigers, and many others.

Additionally, Marilyn brings nearly two decades of experience in the planning and implementation of large and small-scale corporate events. Her commitment to excellence has led to her personal success in a variety of industries including aviation, space exploration, government, economic development, and higher education.

Marilyn worked for with the Los Angeles County Economic Development Corporation, and was responsible for overseeing the LAEDC's key events including the annual Eddy Awards, which during her tenure, honored such organizations as SpaceX, Los Angeles World Airports, Caltech, Magic Johnson, and NBCUniversal.

Currently Marilyn holds the position of Director of Events at California State University, Dominguez Hills. In this role, she oversees a department that manages in excess of 60 annual events. She is also involved in creating a documentary on the Dominguez Hills 1910 Air Meet.

Marilyn has served on Boards for the American Marketing Association, the Association of Western States Aviation Museums, and for the Association of Fundraising Professionals.



Thanks a lot for the coordination by Mallorie Vanghel, Serena Quach, and Courtney Best.

*Marilyn McPoland*



# AIAA Los Angeles-Las Vegas Section Hosts JPL Fellow on Robotic Space Exploration: A Vision for Future of Robotic Space Exploration – the next 50 years, on November 13, 2019 *(continued from page 4)*

by Dr. David Sunderland



*Dr. Leon Alkalai answering questions from the audience  
(Photo courtesy of Ken Lui)*

Last for the presentation were a number of fascinating videos. For Mars 2020, we saw illustrations of the helicopter (1.5kg, few 100m range), generation of oxygen from the surface, and storage of samples for retrieval in future missions. We saw a Mars InSight “selfie” video, showing seismometer shield deployment. Other videos showed a climbing robot (Lemur), robotic telescope assembly, comet sampling, and an illustration of the power of AR/VR in Mars exploration. Finally, we were treated to a JPL recruitment video, “Culture of Innovation”.

The Question/Answer period was very lively, and allowed Dr. Alkalai to cover topics that did not fit the time limit of the presentation. Examples include power generation (nuclear and laser beam), optical communication (upgrading the Deep Space Network), telescopes on Moon’s far side (Very Long Baseline radio telescope assembled robotically), challenges for very long missions (anybody home?), repurposing robotic assembly devices, supercomputing, and Venus atmospheric platforms. When asked what innovation “blows his mind”, Dr. Alkalai described the “origami” starshade for an exoplanet telescope. He also got a chance to describe the JPL planning process in more detail (annual tactical & strategic plans, challenges to the departments, and internal workshops). Even after

adjourning, there as a long line of attendees anxious to continue the discussion.



*Left: Dr. Alondra Oubré, and 2<sup>nd</sup> to the Right: Courtney Best, listening to the lecture (Photo courtesy of Ken Lui)*

David Sunderland received BS and MS degrees from the University of Missouri in 1977 and 1978, and the Ph.D. in 1987 from USC. He joined Hughes Aircraft in 1978, where he designed custom ICs for satellites. He joined IBM in 1989, and was responsible for device design, modeling and groundrules in bipolar, CMOS and BICMOS technologies. He returned to Hughes (later part of Boeing) in 1996, where he was responsible for selection and qualification of high-performance, yet highly reliable and radiation-tolerant, semiconductor technologies for spacecraft applications. He became a Boeing Senior Technical Fellow in 2008, and created a Boeing-wide Community of Excellence, advising programs on the insertion of new electronic technologies. Since retiring in 2016, he remains active in planning for the International Reliability Physics Symposium and JEDEC industry standards activities for space parts, while entertaining his life-long interest in “all things space” through AIAA meetings.



*Enthusiastic attendees listening to the presentation  
(Photo courtesy of Ken Lui)*

## To pour, or not to pour-over, that is the question: *(continued from page 5)*

### How to make a pour-over coffee on Mars?

by Jenwei Yeh

**Inspiration from AIAA event on 17 Aug 2019: "Space Architecture and Robotic Space Construction & Manufacturing" by Prof. Madhu Thangavelu, Prof. Boris Fritz, Melodie Yashar, and Dr. Behrokh Khoshnevis**



3D Printing Exhibition by PV Net  
(Photo courtesy of Ken Lui)

Even Prof. Thangavelu provides certain benefits if we located the moonbase in the lava tube. But when can we make sure there is no possibility of being occupied by a space slug? If construction on the surface is necessary, Dr. Khoshnevis and contour crafting provide an autonomous solution for making landing and building utilizing sulfur concrete on the moon. The moonbase may see real estate advertisements from Melodie Yashar. Beautiful. That matches my desire but not my budget. Mars X-House has a view, and security features, featuring the highest tower we can manage, with an overview of the whole facility around our environment, from solar farms, to other new constructions, and factories. I guess now is the time to pour a coffee from my farm. Watching hot water pour over and saturate the funnel, gives us a moment of respite, savoring the aroma, and watching the brewed coffee slowly drip-drop, drip-drop into the cup. Wait...I forgot there is only 1/3rd Earth gravity on Mars. I experience an incredible slow-flowing pour-over coffee then before I modify the funnel into a proper stem radius. I have to make sure the filter I bring will work on Mars. And the grind of the beans has to be just right. A colonizer of space, in the process of self actualization.

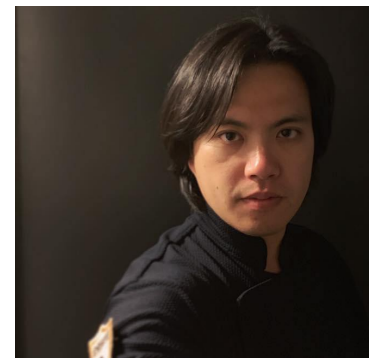
Yes, yes yes, all of this has not happened yet, and remains a work-in-progress. Do we have a team working on this problem of refined coffee enjoyment in space? Or do we believe most people can accept instant coffee and sacrifice the true aficionado's delights with a compromised standard of daily pleasures? These questions pull me back to Earth where I can still enjoy my cafe environment to the fullest.

This was my first time at an AIAA event. Thanks to Dr. Andy Wu for introducing me, and event chair Dr. Ken Lui for inviting me to share my inspiration from this event. It was an impressive Saturday for me. I drew inspiration from and learned from the experts, about just what they are speculating for the future and the final frontier.



Attendees enjoying the food, drinks, and conversations  
(Photo courtesy of Ken Lui)

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*Jen-Wei Yeh is currently a trainee at Innovart Design located in Brea, CA. His duties include marketing, design, system integration*



*(continued on page 12)*



## Exoplanets ! (On 21 August, 2019) *(continued from page 6)*

by Karen Grothe

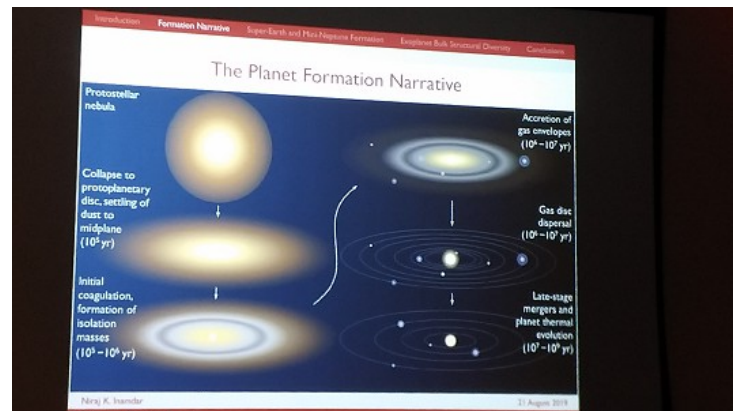


*Attendees asking questions (Photo courtesy of Ken Lui)*

Several planets have been discovered orbiting binary systems, so maybe a planet like Tatooine could really exist! The main NASA mission discovering exoplanets right now is the Transiting Exoplanet Survey Satellite (TESS) mission which is tiling the entire sky in two years. It's expected to discover around 16,000 planets compared to the 4,034 found so far. The good news is that the TESS mission has been extended by 2 – 4 years! The next planet-hunting mission from NASA will be the Wide Field Infrared Survey Telescope (WFIRST) launching next decade to stare at the center of the galaxy for 500 days. WFIRST is predicted to find 100,000 planets, keeping us on track to find 1 billion planets by 2057! You can find out more about exoplanets at <https://exoplanets.nasa.gov/>.

Dr. Inamdar, an MIT alum and a Senior Principal Systems Engineer at Raytheon, presented “The Diversity of Observed Exoplanetary Systems: Pathways to Exoplanet Formation”. The discovery of exoplanets allows us to contextualize our solar system, to test planetary formation theories which came only from our understanding of our own solar system. Planet formation and evolution must pass through several distinct steps: 1) protostellar nebula; 2) collapse to protoplanetary disc with the dust settling to midplane; 3) initial coagulation and formation of isolation masses; 4) accretion of gas envelopes; 5) gas disc dispersal; and

finally 6) late-stage mergers and planet thermal evolution. One question that comes up as we find exoplanets is did Super-Earths (SEs) and Mini-Neptunes (MNs) form inside the planetary nebula or farther out and move in? In rocky core formation, the largest planetary embryos clear their neighborhoods of remaining planetesimals. Impact between embryos could lead to atmosphere loss and mass loss. Mass and radius measurements of SEs and MNs have shown diversity in mean planet density. This diversity leads to a second takeaway question: What is responsible for the broad bulk structural variety in the exoplanet population – photoevaporation or some other mechanism, like collisions? Future exoplanet discoveries and research could answer these questions and many more.



*The Planet Formation Narrative and Exoplanets  
Astrophysics, by Dr. Niraj K. Inamdar  
(Photo courtesy of Ken Lui)*

Author bio: Karen Grothe has 16 years of experience working in the aerospace industry as a systems engineer at McDonnell Douglas, Boeing and Raytheon, and recently started a new systems engineering position at HRL Laboratories in Malibu. She has a passion for planetary science, astronomy, and space exploration, and in particular how small spacecraft (like CubeSats) can facilitate more of that. She is currently serving as the Membership Director for the INCOSE LA chapter and the Vice President of Education for the Westside Toastmasters club.

## To pour, or not to pour-over, that is the question: *(continued from page 10)* How to make a pour-over coffee on Mars?

by Jenwei Yeh

**Inspiration from AIAA event on 17 Aug 2019: "Space Architecture and Robotic Space Construction & Manufacturing" by Prof. Madhu Thangavelu, Prof. Boris Fritz, Melodie Yashar, and Dr. Behrokh Khoshnevis**

, and developing quality assurance procedures for an innovative car-electronics product, with funding by MOST Taiwan. He received his Ph.D. degree in Electrical Engineering from Taiwan Tech in 2017. Yeh's research interests include fuzzy logic systems, adaptive control, and intelligent control. Outside of academia, Yeh is an avid martial arts practitioner, an interactive artist, and a columnist for the Taiwanese maker website vMaker.tw. As a photographer/videographer he established "MISC." which helps several cultural/science organizations, maintaining a database of images and videos in producing science shows and websites. In 2016, He led an interdisciplinary team in a nationwide maker competition developing "RAPS", the Rider Air Purification System, from concept development to prototyping and testing. RAPS garnered 2nd place from among 200 teams nationwide and secured additional funding. He is

also a co-founding member of Taiwan Electric Vehicles Association (TEVA), the only Asian chapter of the US Electric Auto Association. He has also co-founded an association for the Japanese martial art "Jukendo/Tankendo" in Taiwan.



RAPS, and DeskTank!



**Monday, January 13<sup>th</sup>, 2020**

## **Aerospace Professionals Networking Event**

**Spotlight: Honoring minorities (aerospace professionals who are differently abled, gender, racial, ethnic and other minorities)**



**Location: The Museum of Flying, 3100 Airport Ave., Santa Monica, CA 90405**

**Time: 5:00 PM – 8:00 PM, Dress code: Business Casual / Casual**

**Who is invited: Aerospace professionals, family, and friend**

**Price: FREE!!! (Light hors d'oeuvres and refreshments provided)**

**RSVP and Information: <https://conta.cc/2PTII9n>**

**You do not need to be a member of AIAA to attend the event. Volunteers are needed for all AIAA activities)**

**Volunteers are needed, please contact: AIAA LA LV Section Chair ([cgsonwane@gmail.com](mailto:cgsonwane@gmail.com))**

**For event questions, please contact: Events/Program Chair ([events.aiaalav@gmail.com](mailto:events.aiaalav@gmail.com))**

**Who is Invited:** Professionals, Students, friends and family members.

*(You do not need to be AIAA member to attend the event) (Volunteers are needed for all AIAA activities)*

**Free admission and free pizza**

**Saturday, January 25, 2020**

***SNC's Propulsion Division History***

**by**

***Mike Carkin***

***Propulsion Engineer, Propulsion Division, Sierra Nevada Corporation (SNC)***



Michelle Obama Neighborhood Library Community Meeting Room

5870 Atlantic Ave., Long Beach, CA 90805

(East of 710 Hwy, South of 91 Hwy, North of 405 Hwy, and West of 605. Near the junction of 710 Hwy and 91 Hwy.)

(Free Parking in the Library Parking Lot)

RSVP and Information: [conta.cc/2pMnD5z](https://conta.cc/2pMnD5z)

Saturday, January 25, 2020, 10:00 AM - 2:00 PM

Introduction/Presentation starts at 10:30 AM / 10:45 AM

(Ticket sales will end after Thursday, January 23, 2020, or whenever tickets are sold out.)

Dress Code: No open-toe shoes

Contact: [events.aiaalav@gmail.com](mailto:events.aiaalav@gmail.com) or (949)426-8175 (phone/text ok) (AIAA LA-LV Events/Program Chair)

\*Volunteers are needed, please contact: AIAA LA-LV Section Chair ([cgsonwane@gmail.com](mailto:cgsonwane@gmail.com))



## AIAA LA-LV 1/30 Dinner Meeting

(You do not need to be a member of AIAA to attend the event. Volunteers are needed for all AIAA activities)

**Thursday, January 30 , 2020**

# **In the Line of Duty:** **Michael Adams and the X-15** **Michelle Evans**

Author, Bestseller "The X-15 Rocket Plane, Flying the First Wings into Space"

Founder and President, Mach 25 Media ([www.Mach25Media.com](http://www.Mach25Media.com))

AIAA Distinguished Lecturer

Writer, Photographer, and Communications Specialist in aerospace



RSVP and Information: <https://conta.cc/2LNY7p8>

The Proud Bird (The Mission Room, 1st Floor) 11022 Aviation Blvd., Los Angeles, CA 90045

(Free Parking)

(East of LAX & Pacific Coast Hwy 1, North of 105/Imperial Hwy, West of 405 Hwy, South of W. Century Blvd/Hwy 10)

Thursday, January 30, 2020, 5:30 PM - 9:30 PM (Check-in / Buffet starts at 5:30AM) Presentation starts at 7:00 PM.

(Seats/Tickets are limited. RSVP will end after Tuesday, January 28, 2020, or whenever all seats are filled.)

Dress Code: Business Casual

Contact: [events.aiaalalv@gmail.com](mailto:events.aiaalalv@gmail.com) (AIAA LA-LV Events/Program Chair)

\*Volunteers are needed, please contact: AIAA LA-LV Section Chair ([cgsonwane@gmail.com](mailto:cgsonwane@gmail.com))

**Who is Invited:** Professionals, Students, friends and family members.  
(You do not need to be AIAA member to attend the event)  
(Volunteers are needed for all AIAA activities)

## Electric and Hybrid Aircraft mini-Conference

**Saturday, February 22, 2020**

**Dr. Marty K. Bradley**

*AIAA Fellow*

*Technical Fellow for The Boeing Company*

*Boeing Commercial Airplanes Advanced Concepts Group*

**Dr. Susan X. Ying**

*AIAA Fellow*

*Royal Aeronautical Society Fellow*

*SVP Global Partnerships, Ampaire*

**Joseph Oldham**

*President – New Vision Aviation*

*Sustainable Aviation Project – Flight Training with Pipistrel Alpha Electro Trainers*



RSVP and Information: <https://conta.cc/36brp9F>

The Proud Bird, (The Mission Room, 1st Floor)

11022 Aviation Blvd., Los Angeles, CA 90045

(Southeast of LAX, South of 10 Hwy, North of 105 / Imperial Hwy, and West of 405 Hwy.)

(Free event parking in the Proud Bird Parking Lot)

Saturday, February 22, 2020, 10:00 AM - 2:30 PM (Check-in starts 9:30AM)

Presentation starts at 10:00 AM.

(Ticket sales will end after Thursday, February 20, 2020, or whenever tickets are sold out.)

Dress Code: Business or Business Casual

Contact: [events.aiaalalv@gmail.com](mailto:events.aiaalalv@gmail.com) (AIAA LA-LV Events/Program Chair)

\*Volunteers are needed, please contact:

AIAA LA-LV Section Chair ([cgsonwane@gmail.com](mailto:cgsonwane@gmail.com))



See what's happening on our social sites: Please join us, take a look, and invite others! volunteers are needed for social media, please contact [cgsonwane@gmail.com](mailto:cgsonwane@gmail.com)

[linktr.ee](https://linktr.ee), [Meetup](#), [Eventbrite](#), [Engage @ AIAA LA LV](#) AIAA LA-LV Website : [AIAA-LALV.org](http://AIAA-LALV.org)



**Monday, February 24<sup>th</sup>, 2020**

## **Aerospace Professionals Networking Event**

**Spotlight: Engineers Week Celebration and AIAA Headquarter Executives**



**Location:** The Proud Bird Food Bazaar & Event Center (Mission Room, 1<sup>st</sup> Floor)  
11022 Aviation Blvd., Los Angeles, CA 90045

**Time:** 5:00 PM – 8:00 PM, **Dress code:** Business Casual / Casual

**Who is invited:** Aerospace professionals, family, and friend

**Price:** FREE!!! (Light hors d'oeuvres and refreshments provided)

**RSVP and Information:** <https://conta.cc/2XDGbBX>

You do not need to be a member of AIAA to attend the event. Volunteers are needed for all AIAA activities)

Volunteers are needed, please contact: AIAA LA LV Section Chair ([cgsonwane@gmail.com](mailto:cgsonwane@gmail.com))

For event questions, please contact: Events/Program Chair ([events.aiaalav@gmail.com](mailto:events.aiaalav@gmail.com))

## AIAA LA LV Council Members 2019-2020

AIAA LA LV is a non-profit organization and is run by volunteers, who are passionate about aerospace.  
They do not get paid by AIAA.



Chairman of the AIAA LA LV Council  
Dr. Chandrashekhar Sonwane  
email: cgsonwane at gmail dot com

(In Alphabetical Orders)

Philip Baily	Volunteer	Robert Baker	Council Member
Bob Barboza	Council Member	Courtney Best	Volunteer
Jordan Chilcott	Council Member	Niyati Chokshi	Events/Program Co-Chair
Dean Davis	STEM/STEAM K-12 Chair	Pamela de Liz	Volunteer
Diana DiDomenico	Council Member	Laura Duffy	Volunteer
Robert Friend	Advisor / Former Section Chair	Vlad Ionescu	Council Member
Bill Kelly	Treasurer	Fred Lawler	Council Member
Dr. Kenneth Lui	Events/Program Chair	Aldo Martinez	Membership & Awards Chair
Marilyn McPoland	Council Member	Gary Moir	Technical & Aero Alumni Chair
Aakash Naresh	Volunteer	Dr. Seth Potter	Ambassador
Serena Quach	Council Member	Moises Seraphin	Young Professional (YP) Chair
Mallorie Vanghel	Council Member	Kenneth Varghese	Public Policy Chair
Mohana Venkat	Events/Program Co-Chair	Marty Waldman	Las Vegas Chapter Chair
Marsha Weiskopt	Council Member	Dr. Dennis Wonica	Enterprise Chair



## Space Colonization Innovation Competition

### Cash Prizes for Top Three!



#### **Entry Requirements:**

*Physical/Computer models, posters visualizing innovative technologies or ideas for sustained habitation on extra-terrestrial environments. Examples: Transportation, housing, communication, farming, living, etc. Entries will be judged by veterans of aerospace industry.*

#### **Awards:**

*First Place: \$600 & Trophy*

*Second Place: \$400 & Plaque*

*Third Place: \$250 & Plaque*

#### **Submission Deadline:**

*March 31, 2020*

#### **Who can submit an entry:**

*Single or Group submissions. Students, Professionals, Retirees, Family, and Friends. You do not need to be an AIAA member to submit the entry. (There is an additional competition just for High School and Middle School students Contact: [dean.davis@ngc.com](mailto:dean.davis@ngc.com) for more information).*

**Organized by:** AIAA Los Angeles/Las Vegas Region

**Event sponsor:** AIAA CSU Long Beach Student Branch

*Not an AIAA Member? AIAA is currently offering a free one-year e-membership*

<https://www.aiaa.org/emember/>

For any questions regarding this event: College Students Contact: [industry.rep@csulbaiaa.org](mailto:industry.rep@csulbaiaa.org)

Working Professionals and Retirees:

[serena.quach@ngc.com](mailto:serena.quach@ngc.com)

[aldomart@usc.edu](mailto:aldomart@usc.edu)

[frederick.e.lawler@raytheon.com](mailto:frederick.e.lawler@raytheon.com) and

[kenneth.varghese@boeing.com](mailto:kenneth.varghese@boeing.com)

We are always in need for volunteers for all AIAA LA/LV events.

Contact Chair of AIAA LA LV: [cgonwane@gmail.com](mailto:cgonwane@gmail.com).

**AIAA LA/LV Section**  
**Interplanetary Space Colonization (K-12 STEAM) Contest**  
**Cash Prizes for Top Three!**  
**Contest: Design of Human Space Colonies on Other Worlds**

- *How do we get to other worlds and back? (Interplanetary Space Transportation)*
  - *How do humans build shelters on other worlds? What will they look like?*
  - *How do humans obtain air to breath and water to drink on other worlds?*
  - *How do humans grow crops and farm animals to eat on other worlds?*
  - *How do humans power their habitats and transportation systems?*
  - *How do humans communicate back to Earth and to each other?*

**Entry Requirements:**

- *Physical 3-D Models/Dioramas, Posters,*
- *Paintings, Drawings, Sculptures, Computer Graphical Designs*

**Award Judging Criteria:**

- *Creativity & Innovation*
- *Scientific & Engineering Plausibility*
- *Complexity & System Interconnectivity*

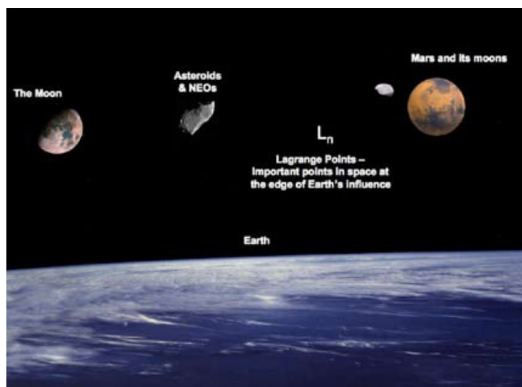
**Awards:**

- *First Place: \$200 & Trophy*
- *Second Place: \$100 & Plaque*
- *Third Place: \$50 & Plaque*

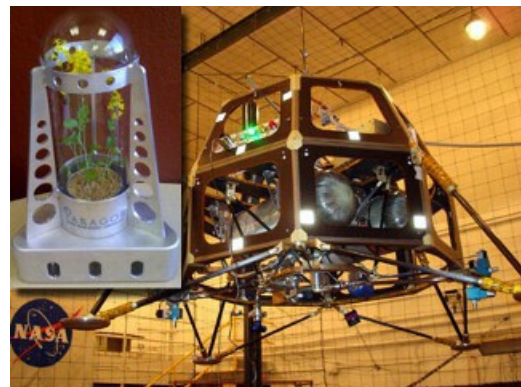
**Submission Deadline:**

**March 31, 2020**

Point of Contact: Dean Davis: [Dean.Davis@ngc.com](mailto:Dean.Davis@ngc.com)



Future Human Spaceflight Potential Destinations



Robot-Tended Lunar Farms

For any questions regarding this event: Dean Davis (AIAA LA-LV STEM K-12 Chair): [Dean.Davis@ngc.com](mailto:Dean.Davis@ngc.com)

We are always in need for volunteers for all AIAA LA/LV events.

Contact Chair of AIAA LA LV: [cgsonwane@gmail.com](mailto:cgsonwane@gmail.com).