



TVIW “POWER OF SYNERGY” SPACE SYMPOSIUM OAK RIDGE OCTOBER 23-25, 2018

This October the Tennessee Valley Interstellar Workshop, in collaboration with Rather Creative Innovations Group, is hosting a special Symposium at the Y-12 New Hope Center in Oak Ridge TN that will promote safe, fast, and affordable human development of our solar system – the first real steps to becoming an interstellar civilization. Leaders from NASA, DOE ARPA-E, Oak Ridge National Laboratory, the Y-12 National Security Complex, and private companies will convene to evaluate how, within a decade, breakthrough technologies can greatly accelerate establishment of permanent colonies on the moon and the first human trips to Mars and asteroids. TVIW 2018 will implement a synergistic approach to space advocacy, using the symposium to link together critical technologies that will catalyze major human space activities by 2030.



Technology Drivers

Currently there is a growing belief within private industry and NASA that nuclear power and propulsion are essential for safe and efficient space development. Unless the national spirit of adventure and exploration that characterized the US space program from 1957 through 1970 can be revived, however, our next steps for human participation will proceed excruciatingly slowly, if at all. Instrumented research is proceeding, but movement of large numbers of humans beyond low earth orbit is still widely regarded as expensive, dangerous, and (given the great distances, long durations, and limitations of chemical rockets) not worth the effort. There is little understanding that technologies already exist that can enable dramatically more powerful energy sources and rockets, while making space development safe and profitable for humans. [See the article on Transformative Technologies.] If combined synergistically with other breakthrough concepts, these technologies will greatly accelerate human progress in space. *Proving this is our central motivation.*

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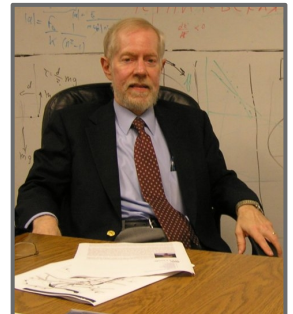
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ANCESTORS AT THE BRIDGE

A SPECIAL ARTICLE BY PAUL GILSTER

Some months back, in the high-ceilinged atrium of a Palo Alto restaurant, I found myself at a banquet listening to French astronomer Olivier Guyon, enjoying a decent Cabernet and chuckling along with the crowd as Guyon spoke about the nearest star.

“Proxima Centauri could be an interesting target, of course. If there is a planet there...”



That “if!” The smiles and knowing looks around the table were because of the inside secret — although the press embargo was still in effect, we all knew that a planet had just been discovered around Proxima Centauri, known, for now, only as Proxima Centauri b. And not just any planet. This was a planet in the habitable zone, meaning a place where liquid water could be present on the surface. And a plan for getting a probe to that planet was unfolding.

Everything seemed to be coming together too fast. I was a writer with a passion for the past, but now I was in the middle of a startlingly futuristic enterprise. How had I wound up here?

The previous April, Yuri Milner had announced a \$100 million project called Breakthrough Starshot, part of a huge philanthropic gift he was making in support of space science and the search for extraterrestrial life (SETI). Starshot’s goals were mind-boggling. Some of the world’s top space scientists have joined the project to design a spacecraft that could be accelerated to 20 percent of the speed of light. That would make a mission to Proxima Centauri with a flight time of 20 years possible. I couldn’t help but reflect on the many turns that had gotten me involved in this.

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TVIW “POWER OF SYNERGY” SPACE SYMPOSIUM OAK RIDGE OCTOBER 23-25, 2018

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Legacy

Since 2011, TVIW has hosted five Symposia that have considered a wide spectrum of technologies and initiatives that might eventually contribute to interstellar exploration. Building upon that legacy, our 2018 Symposium will advocate aggressive near-term goals for accelerated space development, emphasizing how government and private industry capabilities can catalyze breakthrough progress. We need to take serious first steps to move humanity into space, first for cislunar development, then to Mars and our solar system, and ultimately interstellar. This can be catalyzed by synergistic combining of unique, already mature technologies. Our 2018 TVIW Symposium, “The Power of Synergy”, will propose a unified program concept, showing how seven key technologies can be coupled synergistically to enable mankind to escape the bounds of Earth within a decade.

Themes

TVIW Symposia have always taken themes from the symposium venues. Past Oak Ridge symposia have focused on advanced computing facilities and advanced nuclear technologies such as fission reactors and particle accelerators. Huntsville symposia have focused on local space-related technologies, exhibits and facilities. The Chattanooga symposium met in a traditional railroad town, and the theme was “From Iron Horse to Starship”.

Not emphasized in our past symposia, however, was the legacy of huge game-changing contributions to national and world progress already enabled by Tennessee Valley initiatives. Historic examples having unique importance that changed world history are still quite visible: Creation of the Tennessee Valley Authority (TVA) triggered development of the national electric power grid in a decade, beginning in 1933 with the construction of Norris Dam near Oak Ridge. The 1942-45 Manhattan Project, centered in Oak Ridge, developed the first industrial scale nuclear reactors and the isotope separation methods that enabled nuclear weapons and won World War II. And, down the Tennessee River valley in Huntsville, Alabama, the development of the Saturn rockets got us to the moon in 1968. The infrastructures resulting from these great projects still exist, but *a marvelous future demands that new ones must be made to happen now.*

Our October 2018 symposium meets again in Oak Ridge, but this time, the focus is on accomplishing transformative projects through synergistic combinations of technologies that are primed for development. For example, the vast capabilities of Oak Ridge National Lab and the Y-12 National Security Complex can rapidly lead to breakthrough nuclear reactors for space propulsion and power. The very advanced ORNL 3D printing initiative has already created manufacturing of full-sized self-driving vehicles with technologies that can open new frontiers of space industrialization using regolith dust on the moon or materials readily harvestable from near-earth asteroids. And the industrialization of superconducting magnetic materials can open new horizons for highly efficient space systems. The symposium will show how combinations of these capabilities can greatly accelerate space development.

The Power of Synergy can link DOE, NASA, and formerly classified DOD technologies to get humanity into space quickly, and hasten instruments to the stars. Come to Oak Ridge and support our 2018 Symposium!

TRANSFORMATIVE TECHNOLOGIES

The primary goal of our TVIW symposium, The Power of Synergy, is to generate a new vision and integrated plan for development and economic use of outer space within a decade. Courageous leadership with an inspired national team is the vital key. The resulting new jobs, infrastructure industries, and major fiscal growth will insure that the United States continues and expands its traditional roles of creating great innovative futures for the world.

Implementation of the Apollo moonshot depended upon creation of a new Government administrative Agency. In the 1960s, the newly formed NASA unified the best elements of existing government and business functions; and it still enjoys the greatest popularity of any government agency. Recently in March 2018, NASA announced a new cooperative technology development effort with DOE. Our TVIW symposium plans to show how inspired multi-agency cooperation can enable breakthrough technology decisions and accelerate space exploration. ARPA-E can play a significant catalytic role.

We believe that “The Power of Synergy” describes the vital catalytic element that must be applied. Hugely important concepts and technologies already exist that can be combined in new ways, where the sum becomes much more than the parts. Diverse under-exploited technologies can be marshaled together to greatly accelerate human progress in space while – serendipitously -- promoting on Earth greatly enhanced national security, fiscal growth, infrastructure improvement, and human engagement. Thus the TVIW October symposium will endeavor to generate a roadmap for synergy and technology superiority that will make U.S. space development the hallmark of inspired innovative leadership.

Described below are examples of seven technologies and concepts that can initiate transformative progress. Most have high Technology Readiness Levels (TRLs), not requiring decades to implement. Further, all key materials, nuclear fuels, components, and applications can be designed, produced, and industrialized in Oak Ridge and Huntsville facilities, leading to significant local and national economic gains.

1. **High Impulse Nuclear Propulsion** – A huge step forward in compact nuclear reactor design was proved by DARPA in the \$330 Million Timberwind Program from 1988 to 2003. It remains the most advanced candidate technology for space propulsion. Upper stage nuclear rockets (i.e. used only in space) can enable human trips to Mars in thirty days rather than multiple years. Nuclear propulsion is also vital for capture and engineering of small (10 meter diameter) near earth asteroids (NEA) that can facilitate space habitats safe from solar and cosmic radiation. Space solar power and other major industries will be rapidly enabled.
2. **Fiber Optic High Energy Lasers** – Key to efficient wireless power transmission and proven by DARPA for near-term applications, this very mature, high-efficiency technology can lead directly to megawatt-class power beaming capabilities for space power and propulsion. Laser light sails are a fundamentally crucial application extending to interstellar propulsion.
3. **High Temperature Superconductors** – This technology will radically transform all types of electrical applications when fully exploited. It has been developed for thirty years at ORNL and is ready for many game-changing implementations. For example, Magnetically Inflated Cable (MIC) technology can enable very large, low weight and rigid

space structures for solar concentrators. This can implement capture of 10-meter diameter near-earth asteroids to lunar orbits, where they can be robotically engineered to solve radiation shielding and artificial gravity problems for human travel.

4. **Large Scale 3-D Printing** – ORNL and its innovative manufacturing spin-offs are world leaders in this vital new technology. There are direct links to in-space manufacturing possibilities using readily available regolith materials on the moon and asteroids.
5. **Self-Replicating Von Neumann Machines** – This concept will be a vital component to expedite robotic space habitat engineering and large-scale production capabilities on the moon, Mars, and asteroids. Hierarchical Von Neumann machines are an important next-generation spin-off: Very small machines can build ever-larger machines using ambient materials and solar energy. Ever larger and more fiscally powerful space industries will result.
6. **Solar Power Satellites** – Formerly regarded as “pie in the sky,” space solar power with microwave or laser power beaming to the Earth, moon, or planets is now a real possibility. Persuasive concepts already exist for in-space production and deployment of all of the components. Combining the above notions of small asteroid capture for raw materials and Von Neumann machines for ever expanding production capabilities, concepts are viable for totally pollution-free, open-ended supplies of solar energy anywhere in the space out to the orbit of Mars.
7. **Lightweight Large Aperture Optics** -- The above MIC technology leads directly to the possibility of building enormous optical telescopes in space at orders of magnitude lower cost than present ground-based technology. Interferometer arrays of kilometer diameter telescopes will enable imaging and physical diagnostics of earth-like planets around nearby stars. The Search for Extraterrestrial Intelligence (SETI) will be greatly augmented. Perhaps most importantly, the science of cosmology will be massively advanced toward ultimate understanding of the origin and destiny of our universe.

Realization of even a fraction of these technologies and concepts will open limitless horizons for human enterprise and accomplishment in space. This promising outcome depends upon rapid exploitation of transformative technologies focused on human development of outer-space resources, actually having near-term propitious consequences for worldwide stabilization. Naysayers contend that no significant fraction of the population will leave the Earth, so that claims that this is an important effort are specious. However, the history of the growth of the US refutes this contention by analogy. The percentage of the US population that left the comforts of the East Coast was very small; but the effects of having an open frontier were practically, psychologically and culturally very significant: The open frontier provided vast new resources and opportunities. Historians cite the open frontier as a major factor in US cultural development as an adventurous, individualistic, creative society. *Opening space for full-scale development will provide the same advantages for our future.*

WHAT WILL THE SYMPOSIUM LOOK LIKE?

Commitments have already been obtained from selected high-level speakers from DOE, NASA, and related agencies. We are also busily recruiting science fiction authors who can support

our “Loopholes in Physics” theme. We have an understanding that Catherine Asaro will be there!

The structure of the Symposium will be based on a single track, so that no one has to miss any of the presentations. The details are still being worked out; however, the concept is to build on four themes, each leading to the next.

THEME 1: The Case for Near-Term Humans in Space

Chair: John Mankins, *Chair of National Space Society LA Meeting 05/18*

The first theme will characterize the current situation both as it stands and with the planned programs underway.

THEME 2: Candidate Synergistic Technologies

Chair: Jason Derleth, *Director of NASA HQ-NIAC*

The second theme will discuss the transformative technologies (see article) that will allow us to change the vector of current plans and accelerate progress (and travel speed).

THEME 3: Transformative Decade Plan

Chair: Matt Hollingsworth, *Physicist and Entrepreneur from Stanford U MBA program*

The third theme will show how these transformative technologies, together with our current engineering status, can be brought together synergistically. The vision is to create a plan of action that will open space travel and industrialization to a new era of the space age. We compare this to the Manhattan Project in World War II and Kennedy’s challenge to land on the moon in 10 years.

THEME 4: Science Fiction to Science Fact Relationship

Chair: Catherine Asaro, *Ph.D. physicist & renowned science fiction author*

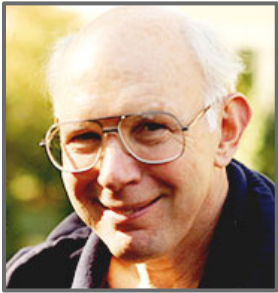
The fourth theme is our look to the future. We do not want the culmination of the Theme 3 effort to be the end – as landing on the moon was. We want to challenge the basic concepts of physics and encourage the examination of possible “loopholes” that will allow human travel to the stars.

Naturally, we will have Keynote addresses to motivate the whole Symposium and its parts. We will also have a Synthesis presentation near the end to tie things together, contributed by our own Paul Gilster!

Many of the speakers have been contacted, as the planned Synergy structure has developed. A Symposium matrix will be announced soon, and if you see a gap, and think that you’d like to offer a presentation, then you’ll have an opportunity at that time.

WHO IS ON THE ORGANIZING COMMITTEE? MAY I HELP?

Certainly, you may help! If you have general questions or are interested in helping, direct your contact Dean Hartley or David Fields. Direct your contact to Joe Meany with publicity contributions, to Doug Loss about web-related tasks, and to Abby Sherriff (HSWT Editor) about publications. If you would like to contribute financially, direct your contact to Dean Hartley. That’s just a guideline – any of the TVIW board is ready to point you in the right direction to become more involved with TVIW activities. If you see something that we’ve missed, please give a call or email. You can contact these individuals through the website (tviw.us/tviw-symposium-on-the-power-of-synergy/) or by emailing info@tviw.us.



Dr. John D. G. Rather
General Chair of the TVIW Power of Synergy Symposium

Dr. Rather is known internationally as a scientific innovator and creator of major technology programs. His experience in business and government spans defense, space, medical, and industrial communities. Dr. Rather worked in physics and space research at three National Laboratories before moving into the business sector to create and manage large applied research and development initiatives. This work led to high-level involvement with the U.S. Government, where he frequently provided invited expert testimony to the U.S. House, Senate, and White House concerning issues of technology and science policy. During the 1980s, Dr. Rather became Vice President for Research and Technology Innovation at Kaman Aerospace Corporation, where he led that Fortune 250 company into profitable new directions. In 1990, he was recruited to join the Senior Executive Service of the U.S. Government at NASA HQ in Washington DC. As Assistant Director, Advanced Concepts Systems Integration, he mobilized innovators in NASA, other government agencies and U.S. industries to accelerate space systems development. In 1992, he served as Chairman of the NASA/DOE study of asteroid impact prevention mandated by the U.S. House of Representatives. For more than twenty years he was also a contributor at the D.I.A. and the C.I.A. In 1997, the Barbara Ann Karmanos Cancer Institute, then affiliated with Wayne State University (WSU) in Detroit, created a new position for Dr. Rather. His new concepts, utilizing physics and engineering applied to cancer detection and cure, generated large financial support for Karmanos R&D. He was also named University Professor of Physics at WSU. Dr. Rather founded the Rather Creative Innovations Group, Inc. (RCIG, Inc.) in 2006 to create new opportunities for economic and societal growth and to engender focused revolutionary technology breakthroughs. The RCIG website is www.RCIGinc.com.



Dr. Dean S. Hartley III
Co-Chair of the TVIW Power of Synergy Symposium

Dr. Hartley is known internationally as a problem solver and expert in operations research (OR). Operations Research is the "Science of Better," the discipline of modeling complex problems to make better decisions. He has been solving problems for customers for more than forty years: two years while in graduate school, four years

while on active duty in the Army, nine years in private industry, fifteen years at the Oak Ridge Federal Facilities, and fourteen years as Principal of Hartley Consulting. The Hartley Consulting website is <http://dshartley3.home.comcast.net>.

Hartley is a Director of the Military Operations Research Society (MORS), a past Vice President of the Institute for Operations Research and Management Science (INFORMS), past President of the Military Applications Society (MAS), and a member of the INFORMS Simulation Society (ISIM). He also serves as the Technical Advisor for Operations Research and Modeling to the International Psychopharmacology Algorithm Project (IPAP). Hartley is a Senior Fellow with the George Mason University School of Public Policy, a consulting resource

for the Naval Postgraduate School (NPS), MOVES Institute, and a Research Fellow with the University of Alabama in Huntsville, CMOST. Hartley has published *An Ontology for Unconventional Conflict*, *Unconventional Conflict: A Modeling Perspective*, *Predicting Combat Effects*, co-authored two books, contributed numerous chapters to other books, and written more than 150 articles and technical documents. In 1994 he was awarded the Koopman Prize for best publication in military operations research and in 2013 he was awarded the Steinhardt Prize for lifetime achievement in operations research. His expertise includes modeling and simulation of combat, irregular warfare (IW) operations, verification, validation, and accreditation (VV&A) of models, and psychopharmacology modeling.

TVIW 2018 REGISTRATION

We have just begun populating the website, with registration information, at tviw.us/events/the-power-of-synergy/. We have preliminary information about the hotels and restaurants in Oak Ridge and other pertinent information.

QUESTION TO THE READER...

Our outreach to the universe via Interstellar travel needs to be grounded (some may dispute this word) in Earth-orbit, cis-Lunar, and Mars-transit capabilities. We need to protect, understand, and explore, our nearby space.

So ask yourself, "Which of our top rocket systems will take Mankind to Mars? As a start, you might choose between NASA's Space Launch System (SLS), SpaceX's Big Falcon Rocket (BFR), and the Blue Origin rocket New Glenn." No cheating -- you must have your answer before you read on [continued on page x, maybe].



Astronaut Chris Hadfield offered his answer to this important question:

"Personally, I don't think any of those three rockets is taking people to Mars. I don't think those are a practical way to send people to Mars because they're dangerous and it takes too long... My guess is we will never go to Mars with the engines that exist on any of those three rockets unless we truly have to."

[source: www.businessinsider.com/chris-hadfield-mars-travel-nasa-spacex-blue-origin-2018-6]

Yes, rocketry is dangerous, especially using cryofluids and explosives. Maybe we can survive radiation over a 9-month journey with heavy mass or electromagnetic shielding; maybe we can survive weightlessness by spinning our ship; and maybe we can survive hunger and each other by sleeping. But the mid-flight risk of long journeys has roughly a linear dependence on flight duration. Until we can shorten the trip by sleeping near the event horizon of a captive black hole (and dealing with spaghettification), we need to employ high sustained-acceleration rockets that can be tailored to human needs. That's part of what TVIW 2018 is about.

ANCESTORS AT THE BRIDGE

A SPECIAL ARTICLE BY PAUL GILSTER

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Maybe it was Truman Bradley. The name may not be familiar any more, but Bradley was at one time considered the leading radio news commentator in the Midwest, taking on a variety of radio jobs before moving out to California to become the announcer for Burns and Allen and various other shows. But the Bradley gig I most remembered was his hosting of the 1950s TV series Science Fiction Theater. The show told a different tale every week, with plots so ludicrous that even I, just a 4th grader at Community School in St. Louis, could pick out their implausibilities.

But that didn't matter. Because when the show opened, there was Bradley, sitting magisterially at his desk, surrounded with scientific equipment. A microscope might stand nearby, while behind him was an oscilloscope (depending on the nature of that week's show). He would intone a few thoughts about the science behind the latest story with such authority that every particle of my being wanted to believe him. But more importantly, I wanted to be surrounded with such fabulous equipment myself. I didn't want to be a scientist, but I wanted to hang out with them.

My experience in grad school immersed in medieval language and linguistics had helped me realize I had an entirely different brief than theirs, but one that might prove useful. It was encapsulated in something French writer and pilot Antoine de Saint-Exupéry once said: "If you want to teach someone to sail, you don't train them how to build a boat. You compel them to long for the open seas." When I read that quote, I came to realize that my work had a theme.

Now here I was at a busy restaurant surrounded with a lot of familiar faces, people I had corresponded with for years as I tried to follow developments in deep space technologies for my website, people I had met at various conferences, and some who were known to me only by reputation. A bit frazzled, I accepted a second glass of wine, knowing I would have to stop there, because it is my life's curse that if I drink more than two drinks at a sitting, I go to sleep.

And this was not a place to go to sleep. These people were big shots, but they were unfailingly cordial and welcoming to me (ah, the wine was having its effect). The year before, Greg Benford, who had been a visiting scholar at Cambridge, wrote a piece I published on Centauri Dreams that talked about a dinner at Trinity College. There at the table were cosmologist Martin Rees (Britain's astronomer royal), Stephen Hawking, Freeman Dyson, Paul Dirac and other luminaries, and I remember Greg saying "I decided this was a night to keep my mouth shut." Tonight in Palo Alto, that was my sentiment. Just listen, and be sure to take lots of notes.

So I listened. I knew about Breakthrough Starshot because I had been writing about it, but even now, the concept still dazzled. Build an enormous laser array, somewhere high and dry (the Atacama Desert of Chile suggested itself). Power up this massive array to send a coherent laser beam to an orbiting "sail," a round or perhaps rectangular object about four meters across made of a yet to be developed material whose properties were still being investigated. Put an incredibly complex payload smaller than an iPhone in the sail. Hit it for two minutes with the beam. Then do it again, on another sail. And another. Send hundreds of sails, thousands.

Two minutes under a beam as strong as the one being proposed would take a small sail from Earth orbital speed up to 20 percent of the speed of light under thousands of g's, after which commences the long cruise to Proxima Centauri, or whatever target was finally chosen. Once there, the sails in their multitudes swoop past the planet under study to send back data, just as our Voyager spacecraft did for the outer planets in our own Solar System. Bear in mind that Proxima Centauri is close to 9000 times further away than the Voyager's final planetary destination, Neptune (though both Voyagers, incredibly, are still reporting home).

How to make this happen? The meetings are ongoing, and the problems are so vast that there is no certainty the mission can ever be flown. But the initial studies, to cover a five-year concept analysis, will uncover which of them can be solved. Communications is a gigantic problem, but networking the fleet of tiny payloads and using their sail structures as antennae might work. At a later meeting, I would see a complex mathematical analysis of how to do this, most of which went way over my head, but these guys know their stuff. If there's a way, they will find it.

Maybe the link between my science writing and my life as a medievalist is simply this: Both demand taking a long perspective. We are awash in immensity. It's the same feeling I get when walking under a night sky and seeing, on a good viewing night, the spangled band of the Milky Way. 200 billion stars, and we now have good reason to believe that almost every one of them has at least one planet. Some analyses project habitable planets — Earth-like planets — in the billions in our galaxy alone. Multiply by perhaps 150 billion galaxies in the visible universe, some smaller than ours, some much larger. Think about the odds that there are other civilizations.

Medieval people had moments of immensity like this under their own night skies, and their interest in the stars above them was compulsive. They wove comets into their tapestries. There is a sense of mystery in all this that I find at the heart of literature, for the dazzle of the cosmos is matched by the dazzle of the human enigma. Just who are we, and how do we experience our lives, and what puzzles do we entangle in our relationships with each other and with the cosmos we continue to study?

So I'm at home with these people who are trying to push a little deeper than we have ever pushed into the dark and I share their enthusiasm, even though I can't follow their mathematics. We all look for common threads, I think, as we try to make sense of our lives. Right after grad school, I pushed straight into commercial aviation, an odd path but I had decided against teaching and was burned out with academics. I had been through a messy divorce, had lost my dissertation director to retirement, and never wrote my thesis. But one night in the cockpit on a long flight I found myself turning off the instrument lights and locating a few familiar stars.

Hey, the old airmail pilots did it this way when the clouds closed in, putting a familiar star off the starboard wingtip, watching cloud motion against the moonlight to account for drift. Classic dead reckoning under a spangled sky. Those same stars were out that had become so familiar to me when I was a kid with a telescope, the same stars that burned over Chartres in the Middle Ages, over the cathedral at Canterbury, over the cloud-smoky bay of Reykjavik. Learn to trust the stars, the crustiest of my instructors once told me, and they will take you home.

Stay focused, then, on Alpha Centauri. Breakthrough Starshot's plans beyond the early concept stage proceed to initial laboratory work and prototyping. If the mission ever flies, it won't

happen any earlier than 35 years from now. That makes the earliest conceivable Proxima Centauri flyby in 55 years. We certainly won't see Proxima Centauri b up-close during my lifetime.

But I realized as the dinner began to break up and we walked out into a fine Palo Alto night that I was not dismayed by this. Medieval artists and craftsmen began cathedrals whose completion they would never see. Such projects were an act of faith in the future and a gift to their descendants. Is there any better goal for all our work?

We must learn to look back in time, far back, and then forward into the deep future. Build your bridges, says an old proverb, as if your ancestors were crossing them.

TVIW 2018 SCHOLARSHIP PROGRAM

We are again offering three scholarships (2 undergraduate, 1 graduate) of \$2500 each to the winners of our merit based application process, where the applicants are required to complete an essay with their application. We have received applications from all over the Southeastern US, and they are in the hands of the judging committee. We hope to get all the judges' results in time to announce a winner around July 15, 2018.

Many thanks to Baen Books and Rob & Ruann Hampson for their support of these scholarships.

TVIW SOAPBOX

On May 18, 2018, TVIW officially launched a new initiative called Soapbox, which aims to tie together points of discussion directly relevant to the space community at large, and the interstellar community in particular. The first post on the section, "Paying for the Stars," concerns economic hurdles that exist before humanity can really reach for the planets and stars in earnest. It considers the critical contribution of trans-generational wealth-management practices in the near term to bring about lofty spacefaring goals, and how we might envision different economic models to overcome the barriers in our path. Two contributors, Armen Papazian (CEO of Finoptek) and author Nick Nielsen, provide an incredible amount of context and grounding for this inaugural article and we hope to see more such high quality posts from our contributors.

The posts are lightly moderated, there is no requirement to be associated with TVIW or with any other interstellar organization. We only require that there be no libelous content toward any individual or organization, that the articles have some meaningful connection to interstellar exploration, and that the language used not be profane. Submissions that don't meet these guidelines, or for which there is some question about their applicability, will be returned to the writer for modification. To submit content for a Soapbox post, just send a message to soapbox@tviw.us with the Soapbox content and title in the body of the message, and a subject of "Soapbox submission."

TVIW's vision for *Soapbox* is to provide a platform dedicated to thoughtful public discussion about plans to make definite, concrete steps to reach the ultimate frontier by whatever energy individually motivates us. Join us at the table. Let us know what you think. This is *your* Soapbox.

2019 TVIW SYMPOSIUM ANNOUNCEMENT

TVIW will present its Sixth Interstellar Symposium on November 10-13, 2019, in Wichita, Kansas, hosted jointly by Wichita State University and Ad Astra Kansas Foundation.

We will be at the Hotel at Oldtown, utilizing their conference facilities. A tour to the Cosmosphere, in Henderson, KS, will be available on November 14. And the old favorites of a stellar program, the Hospitality Suite, and lots of time to talk to colleagues and new friends will be part of our symposium experience.

A Call for Papers, hotel information, and registration information will be coming soon.

For more information on the host or tour:

Wichita State University: <http://www.wichita.edu/>
Ad Astra Kansas Foundation - <http://adastra-ks.org/>
Cosmosphere - <https://www.cosmo.org/>



2018 TVIW BOARD OF DIRECTOR CHANGES

The newly elected TVIW Board of Directors are listed below. This includes two new members elected in January 2018, Paul Gilster and Doug Loss, and Sandy Montgomery moving into the President position.



Edward "Sandy" Montgomery
President

Edward "Sandy" Montgomery has rejoined the Board of TVIW after a brief hiatus. He has over 35 years commercial and civil service in the Huntsville aerospace community. He retired from civil service in 2015 and is now consulting on NASA's Near Earth Asteroid Scout solar sail mission and the James Webb Space Telescope, both planned for 2018 launch.

He gave a talk at TVIW 2014 titled “Solar Power Pipeline for Interstellar Travel”. He has a Bachelor in Aerospace Engineering from Auburn University and a Masters of Engineering from University of Alabama in Huntsville. He is married with three adult sons and lives in Lacey’s Spring, near Huntsville, AL.

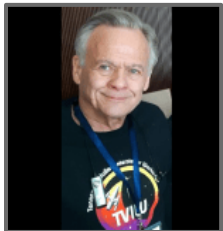


Martha Knowles
Secretary/Treasurer

Martha Knowles, our Secretary/Treasurer, was a professional librarian and records management specialist. She was administrator and Registrar for the first four TVIW symposia (2011, 2013, 2014, 2016) and

was very involved in TVIW 5 in 2017.

In another time and place, she is active in the Society for Creative Anachronism, as well as several local science fiction conventions (such as LibertyCon in Chattanooga, TN). She lives in Oak Ridge, TN, with her husband and two cats.



David Fields, Ph.D.
Director at Large

David Fields (Ph.D., Physics, Univ. of Wisconsin) returned to the TVIW board after a brief hiatus. He is the Director of the Tamke-Allan Observatory, and the ORION founder/VP. He presented at the 2011, 2013, 2014 and 2016 TVIW

Symposia. In addition to a research career at ORNL, he has had visiting scientist appointments in Germany and Brazil, served as an IAEA “technical expert”, and was a Consulting Physicist at ISSI for NASA. In addition to being a past president of the Tennessee Academy of Science, he has taught at UW, RSCC, PSTCC, and UFMG. He holds two U.S. patents and his current interest is in RASDR, a computer-interfaced radio astronomy instrument. He lives in Knox County, TN.



Paul Gilster
Director at Large

Paul Gilster is a full-time writer who focuses on space technology and its implications. He is one of the founders of the Tau Zero Foundation, an organization that grew out of work

begun in NASA’s Breakthrough Propulsion Physics program and now supports research into advanced propulsion for interstellar missions. Gilster is the author of seven books, including *Digital Literacy* (John Wiley & Sons, 1997) and *Centauri Dreams: Imagining and Planning for Interstellar Flight* (Copernicus, 2004), a study of the technologies that may one day make it possible to send a probe to the nearest star. He tracks ongoing developments in interstellar research from propulsion to exoplanet studies on his Centauri Dreams Web site (www.centauri-dreams.org). In past years, Gilster has contributed to numerous technology and business magazines, and has published essays, feature stories, reviews and fiction in a wide range of publications both in and out of the space and technology arena. He is a graduate of Grinnell College (IA) who performed graduate work in medieval literature at UNC-Chapel Hill before going into commercial aviation (flight instructor specializing in instrument and commercial training). He turned to full-time technology writing in 1985.



Douglas Loss
Director at Large

Doug is originally from central Pennsylvania; he has worked in the IT field, principally in network administration and security, for the past 30 years. He organized and ran an international internet organization

called SEUL/edu, which fostered and promoted the development and use of Open Source software in schools around the world. He handed operation of that organization off when its focus became less IT and more education (this change in focus was intended and encouraged from the beginning), as he wasn’t an educator.

From 1977 until the early 2000s he attended and eventually organized The Asimov Seminar, a yearly, four-day-long retreat at a conference center in upstate New York. Isaac Asimov, the noted science fiction author, was the star of the Seminar and its main draw until his death in 1992. Each year the Seminar would explore a different topic, always with some (sometimes vague) connection to science fiction. The topics were always approached interactively, with the Seminar attendees assuming roles that would allow them to examine the questions associated with that year’s topic on a personal basis. Doug currently lives in Maryville, TN with his wife Ruby.

UPCOMING INTERSTELLAR AND SPACE EVENTS

June 29-July 1, 2018 (Chattanooga, TN). LibertyCon Science Fiction Convention. Website: libertycon.org

July 23-25, 2018 (San Francisco, CA). ISS R&D Conference 2018: Pioneering New Frontiers. Website: issconference.org

September 17-19, 2018 (Orlando, FL). AIAA Space Forum (International Space Planes and Hypersonic Systems and Technologies. Website: space.aiaa.org/Hypersonics/

October 21-26, 2018 (Knoxville, TN). AAS Division of Planetary Science 50th Annual Meeting. Website: dps.aas.org

October 23-25, 2018 (Oak Ridge, TN). TVIW Symposium on The Power of Synergy. Website: tviw.us/tviw-symposium-on-the-power-of-synergy/

November 10-13, 2019 (Wichita, KS). TVIW’s 6th Interstellar Symposium. Website: tviw.us/

November 2018 (Gloucestershire, UK). Initiative for Interstellar Studies: Definitive Conference on Interstellar Spaceflight. Website: I4IS.org

SEEKING INPUTS FOR UPCOMING ISSUES OF HSWT

We invite your contribution to this newsletter of nominally 200-500 words, written on an Interstellar topic that you think is of compelling importance, or a topic that you think that we may actually be overlooking.

Please send your submissions in MSWord format to Abby Sherriff, TVIW Newsletter Editor, and to David Fields, TVIW Director at Large.

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