



SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

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Passing the SETI Torch

by H. Paul Shuch, Executive Director Emeritus

When I first became engaged in the SETI discipline more than four decades ago, the founders of the field (with household names such as Drake, Oliver, Billingham, Kraus, Bracewell, and Morrison, to name just a few) were still very much alive and active, offering both leadership and mentorship. Senior educators and scientists all, I sought them out, and found them all most generous with their time and guidance. With their encouragement, I joined SETI Generation Two. The pioneers of Generation One nurtured and guided me, enabling me to become modestly successful. I only hope I proved worthy to follow in their footsteps.

This June, while attending SETIsymposium2022 at the Pennsylvania State University, I was given the opportunity to meet some of those I will call SETI Generation Three, a sizeable cadre of graduate students and postdoctoral scholars whom I look forward to mentoring. This is altogether appropriate, as I have now reached the age that many of SETI's pioneers had attained when first I sought out their guidance.

I found the quality of the posters and presentations I observed at Penn State truly stunning. SETI Generation Three is employing tools from disciplines that didn't even exist when I started down the yellow brick road, and those tools (from diverse fields such as gaming theory and machine learning) are opening up doors I never knew existed. And because of these talented youngsters, the discipline is evolving. What started out as observational SETI has been transformed into a complex search for biosignatures and technosignatures. Despite what little mentorship and encouragement I can offer, I find myself sitting back and watching in awe from the sidelines.

And this, of course, is as it should be. SETI is a dynamic, not a static, discipline. In the words of Leslie Fish's inspiring song Hope Eyrie, "if you will not perish, then grow." And the growth of the SETI field is truly astounding.

I took a lot of pictures at SETIsymposium2022. In this issue of *SearchLites*, and over the coming months in our Image of the Week posts to the SETI League website, you will meet many of the members of SETI Generation Three. Hopefully, as we are able to put pandemic restrictions behind us, you will meet some of these gifted young scientists in the flesh. I'm certain you will be as impressed as I am.

I am very proud to be able to pass the SETI torch to such worthy descendants.

Guest Editorials:

Pivot Point **by Kim Maxwell**

from the September 2022 issue of Penn Central,
the monthly newsletter of Central PA Mensa,
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The concept of a pivot point is commonly used in Physics, Engineering and Finance. The general definition of pivot is: a pin, point, or short shaft on the end of which something rests and turns, or upon and around which something rotates or oscillates. The financial sector uses formulas and algorithms to determine “pivot points” which trigger stock buy/sell actions. In politics and business, a pivot point is a dramatic change in policy, position, or strategy. In my High School marching band, the pivot point was the person who stood still in a pinwheel line.

Engaging, whether intentionally or unintentionally, with a pivot point, causes a reaction and a change of direction. A pivot point deflects and redirects the forward flow; it technically changes the future. In our daily life, we run into pivot points many times in a day without even realizing it. Do we get up when the alarm clock rings, or sleep an extra 10 minutes and arrive late to work? Do we look at the weather report and grab an umbrella before heading out? Do we drive over the speed limit to make up for the time we slept in? A more common term is to make a decision. One may not even be aware that a decision was made, until that decision consciously impacts one’s reality. In retrospect, we can see the pivot point – the point at which another choice was possible. And the game of “What if I had done something else” begins.

Sometimes though, the pivot point looms large before us; it’s all we can see. The pivot point may be choosing a school, or taking a job, or signing a mortgage or accepting or declining medical treatment, getting a puppy or moving to a new state. We are aware that we are deciding the future. Generally, this type of pivot point will be outside of our comfort zone, and there will be some risk involved. We will also be very aware that we could regret our choice. The antonyms of “pivot” include “remain, settle, halt and stop”. And too often when confronted with a pivot point, these are also options that are available to us. We can remain paralyzed – pinned in place with a deluge of “what ifs”; the risk is simply too high.

Often, we try to navigate a pivot point with, “I’ll try”, which is a non-committal non-decision. As Yoda famously said, “Do or do not – there is no try.” Sometimes, we know what we want to do, but we can talk ourselves out of it with all sorts of negative self-talk. Sometimes we can lie to ourselves, sugar coat the facts and convince ourselves to choose poorly. We can orbit the pivot point indefinitely hoping for some Deus Ex Machina to make the decision for us. Sometimes that is exactly what we get. We find ourselves facing a dead end, wits end, final straw, point of no return sort of pivot point. Sometimes these are the easiest pivot points to manage, because we are simply reacting without the paralyzing analysis. These are things like being laid off from a job, or totaling a vehicle or being served with divorce papers or getting a serious health diagnosis – to name just a few. The future arrived, whether you were ready or not.

A pivot point is, however, only a pivot point if there is an actual pivot. A pivot is the process of adjustment to the pivot point, of changing course and choosing a new path forward. The opposite of a pivot is to NOT pivot – to stay where you are with no change in direction and no forward advancement. This is when we are facing a dead end, we’ve hit the wall or it seems like the end of the road, and we simply stop. In my high school marching band, all the pivot point could do was stand at the point of change. If the squad chose not to pivot around him or her, it would have made for either a very boring or a very chaotic half time show.

The same concept applies to our daily lives. We can’t advance and grow in life without reacting to pivot points, so it is worthwhile to learn how to negotiate a graceful turn when possible, or at least know how to scramble back in line when we miss a step. Not pivoting – standing still - is generally disastrous. Like a marching band, the world moves forward around us and we need to learn how to move and turn with it, or risk being out of step, or even being left completely behind. None of us has a drum major or choreographer following and guiding us through life to keep us straight. The pivot points don’t move. How we react to them is completely up to us. Our lives can be boring, energetic, elegant or chaotic – smooth or choppy – happy or sad. Do or do not.

Editor's Note: In the context of SETI science, the confirmed detection of an extraterrestrial civilization would represent humanity's most challenging pivot point. Thus, we SETIzens must consider the social science implications and impact which a successful search would have for our entire planet.

Complementarity

by Dan Duda

from the August 2022 issue of Penn Central,
the monthly newsletter of Central PA Mensa,
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I've recently run across a new (to me) Nobel-winning theoretical physicist (writer) who provides a potentially significant key to understanding reality. In his book *Fundamentals*, Frank Wilczek states that two conflicting views of reality may both be true, depending on what perspective one chooses to look at. "Picasso and the cubists created visual art that captures complementarity pictorially. By taking up different perspectives on a scene in the same picture, they were liberated to bring out with greater freedom aspects they feel are important."

One of the most mysterious issues to come out of the quantum revolution in the early 1900s is Heisenberg's Uncertainty Principle. For example, we can't learn the position and the momentum of a particle at the same time. We must set up an experiment to look at one or the other. We can never know both at the same time. Picasso's portraits are so confusing to most of us because we are unable to limit our perception to just one of the images. With cubism he presented combinations of ideas into a single image.

Wave/particle duality, exemplified by the famous and enigmatic two-slit experiment, is another example. Depending on how we set up the experiment, the same object is either a wave or a particle. Some attribute our conscious observation to the result, seeming to indicate that we participated in creating reality. Schrodinger's Cat is another case - it has a complimentary existence (both alive and dead) before we look.

Wilczek also suggests reality is guided by probability. Interestingly, quantum mathematics is also based on probability. You can't predict the result of one experiment, but as the N increases toward infinity quantum equations are perfect in their predictions based on comprehensive results.

Explaining his view on complementarity, Wilczek said, "There can be different ways of approaching the same question. Often there are different ways of describing the same thing. They can be valid each in their own terms, but they may sometimes be very difficult or even impossible to reconcile." To me, this indicates a deficit in the ability of the human mind to handle the issues we face as we search for ultimate truth. However, it seems that the quest for understanding is a fundamental feature of mankind, if not as individuals certainly of humanity overall.

Wilczek has some support in the philosophy of Gottfried Leibniz who said, "There are also two kinds of truths: truth of reasoning and truths of fact. Truths of reasoning are necessary, and their opposite is impossible; those of fact are contingent and their opposites are possible." Leibniz and especially Spi-

nosa shared a tendency toward pantheism with Wilczek. Sponzoza "required that his philosophy exhibits the whole universe as a single connected system." My spin (here again) is that in a pantheistic universe the apparent enigmas contained in quantum reality would be understood if only man could grasp the unity of reality.

To sum things up, Wilczek, in my opinion, has added some worthwhile perspective to the conceptual challenges of grasping the reality of the quantum universe. I'm impressed with the strength of his logic, and I feel it's useful to add this to our search for meaning. I look forward to more insight from Wilczek and others. But, in the words of Murray Gell-Mann "if someone says they can think or talk about quantum physics without becoming dizzy, that shows only that he has not understood anything whatever about it."

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SETI League members are encouraged to nominate SETI-relevant websites for our monthly SETI SuperStar Award. Nominating emails to our Awards Committee may be sent to:

Awards_at_setileague_dot_org

Please be sure to indicate the URL of the candidate website you are nominating, and a brief explanation as to why you consider the site worthy of recognition.

First Penn State SETI Symposium photos 27 – 30 June 2022



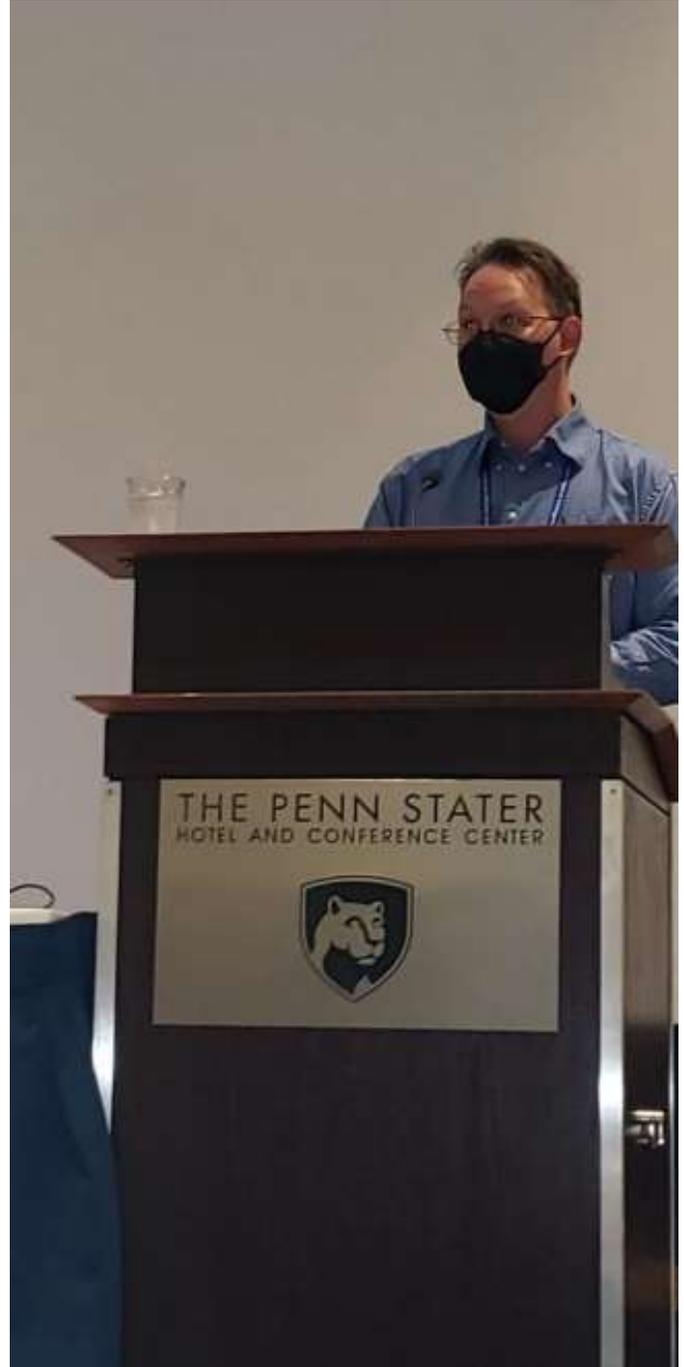
After three years of pandemic-driven delays, the First Penn State SETI Symposium was finally held, drawing 90 attendees. Prof. Shuch is seen here in the front row, center (in the SETI League shirt). Michael Fleck photo



As the opening slide indicates, the much-delayed 2020 Penn State SETI Symposium was renamed the First Penn State SETI Symposium, suggesting that there will be more to come.



Ravi Kopparapu of NASA Goddard speaking about exoplanet detections at the 2022 Penn State SETI Symposium.



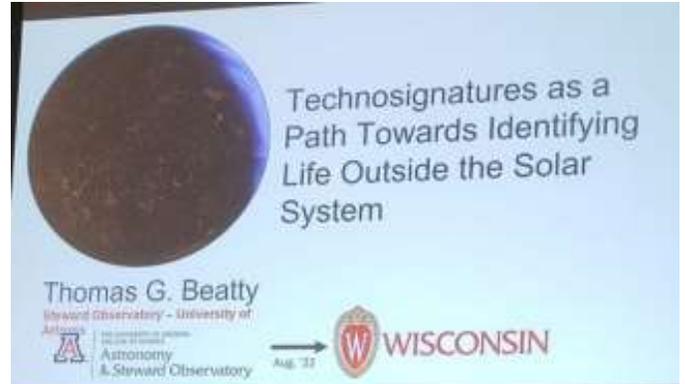
Prof. Jason Wright opens the Penn State SETI Symposium at the Penn Stater Conference Center on 10 June 2022.



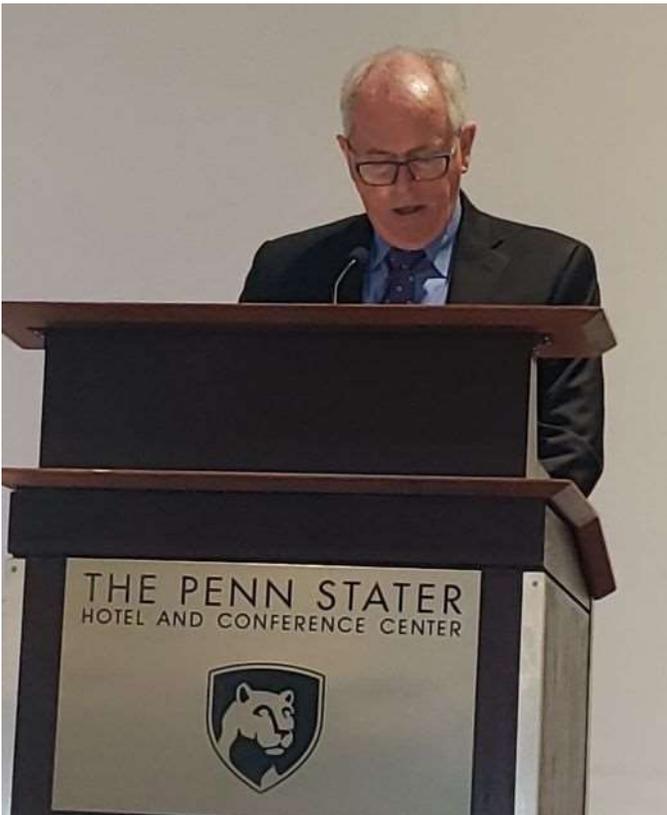
Penn State University enjoyed a good turnout for the General Sessions of its First SETI Symposium this past June.



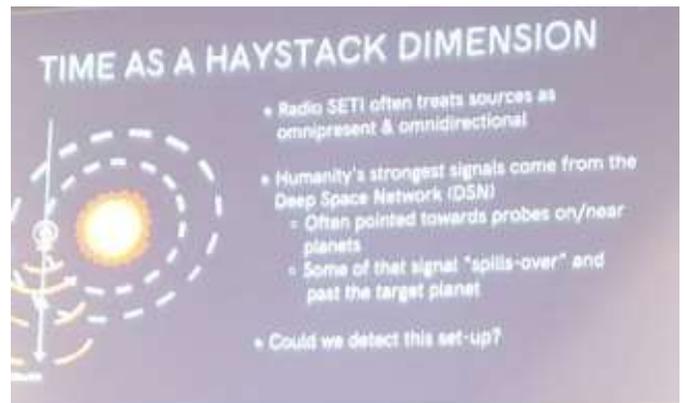
Paul Shuch re-connects with Eric Korpela of the Berkeley SETI Research Center.



Tom Beatty pointed out that city lights could be detected over interstellar distances from technologically advanced exoplanets.



Penn State provost Nick Jones welcome attendees to the First Penn State SETI symposium, 10 June 2022.



Evan Sneed discusses ways to narrow the cosmic haystack at the First Penn State SETI Symposium. >>



Although residing only sixty miles apart, Professors H. Paul Shuch and Jason Wright met in the flesh for the first time at the 2022 Penn State SETI Symposium.



The SETI Post-detection breakout session at SETI Symposium 2022 was conducted in a hybrid format, with panel members presenting from California, Canada, and Pennsylvania.



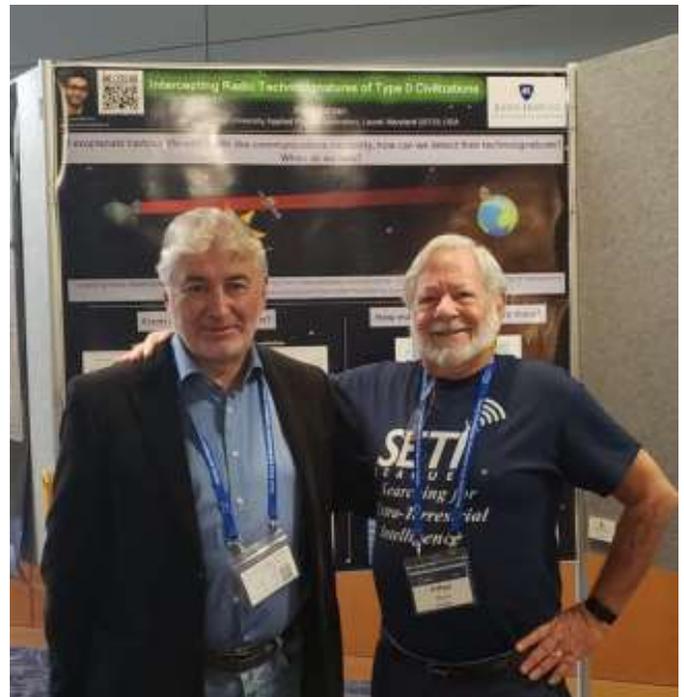
Nearly two decades after they first met in India, Paul Shuch and Vishal Gajjar reconnected at the First Penn State SETI Symposium.



In the first breakout session at SETI Symposium 2022, Rebecca Charbonneau reviewed the historical basis for developing SETI post-detection protocols.



SETI League member Brian McConnell proposes a post-detection analysis pipeline at SETI Symposium 2022.



IAA SETI Committee members Mike Garrett (chair) and H. Paul Shuch (former vice-chair) at SETI Symposium 2022, held at Penn State University, State College PA.



SETI League members Skip Crilly and Paul Shuch chat in front of Skip's poster at SETI Symposium 2022.

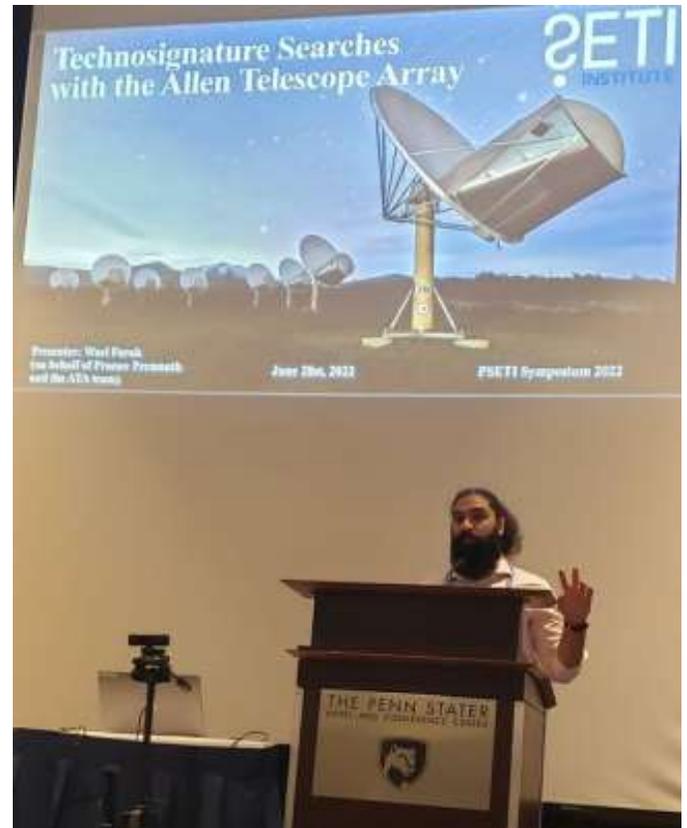


At the SETI Symposium 2022 post-detection breakout session, Kathryn Denning shared an anthropologist's perspective.

Vishal Gajjar reports on wideband detections with the Breakthrough Listen project, at SETI Symposium 2022. >>



Sofia Sheikh introduced her 9 axes of merit for characterizing radio/optical technosignatures, at SETI Symposium 2022.



At SETI Symposium 2022, Wael Farah reports on observations with the Allen Telescope Array.

Event Horizon

SearchLites readers are apprised of the following conferences and meetings at which SETI-related information will be presented. League members are invited to check our World Wide Web site (www.setileague.org) under *Event Horizon*, or email to us at info@setileague.org, to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

Please note that the global COVID-19 pandemic has resulted in the cancellation or rescheduling of many planned scientific meetings and conferences. We recommend you check with the event sponsors for updates before making travel arrangements.

September 1 - 5, 2022: *80th World Science Fiction Convention*, Chicago, IL.

September 18 - 22, 2022: *73rd International Astronautical Congress*, Paris, France.

August 23 - 29, 2023: *81st World Science Fiction Convention*, Chengdu, China.

June 19 – 22, 2023: *Second Penn State SETI Symposium*, State College, PA.

September 25 - 29, 2023: *74th International Astronautical Congress*, Baku, Azerbaijan.

October 11 - 18, 2024: *75th International Astronautical Congress*, Milan, Italy.



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<i>Sing More Songs of SETI</i> (music CD)	\$15	\$18
T-shirts, specify M, L, or XL	\$15	\$22
SETI Nerd Gift Set (one each Mouse Pad, Pocket Protector, <i>Project Cyclops</i> and <i>Tech Manual</i>) at 20% Savings to <u>Members Only</u> :	\$30	\$45

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