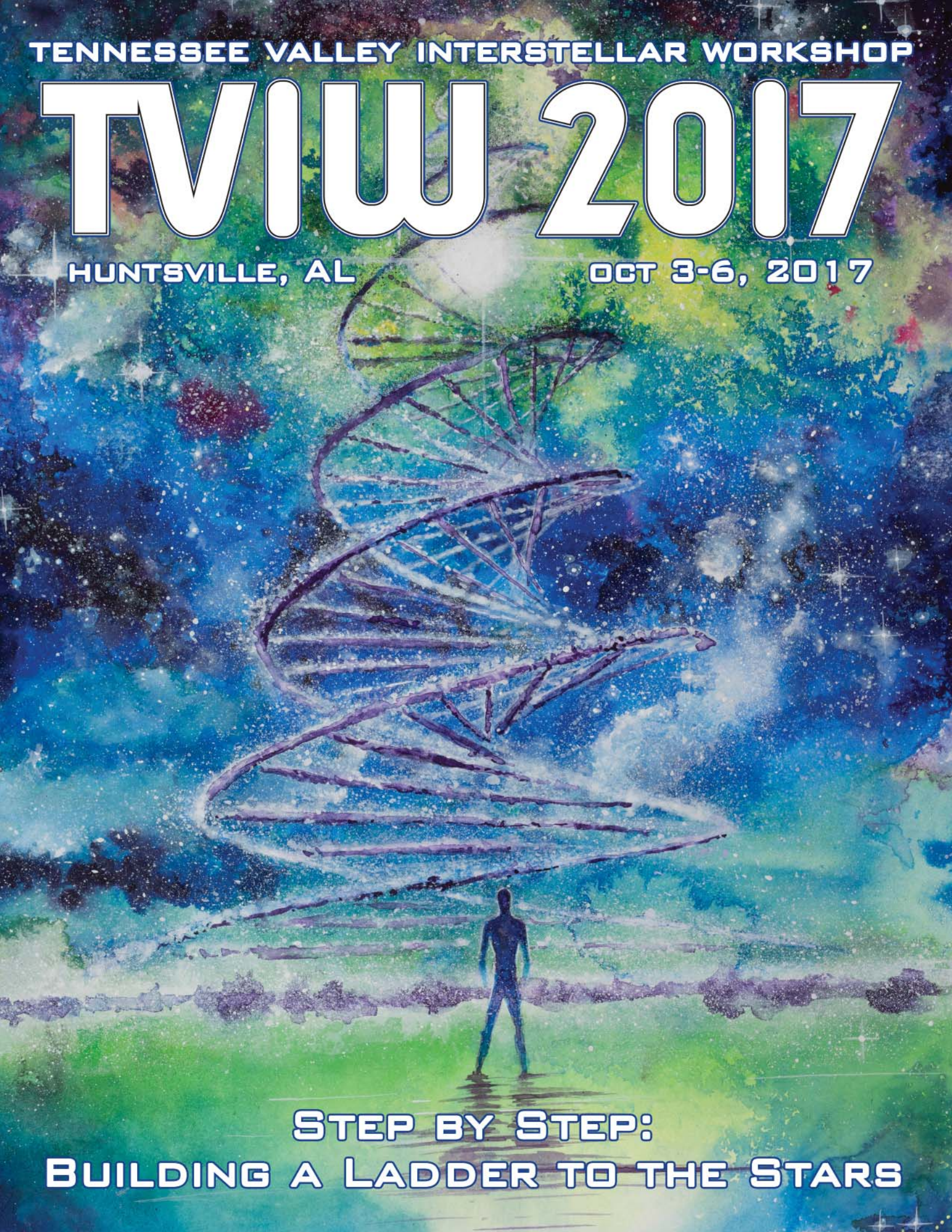
TENNESSEE VALLEY INTERSTELLAR WORKSHOP
TVIW 2017
HUNTSVILLE, AL
OCT 3-6, 2017
STEP BY STEP:
BUILDING A LADDER TO THE STARS

TENNESSEE VALLEY INTERSTELLAR WORKSHOP

TVIW 2017

HUNTSVILLE, AL

OCT 3-6, 2017

Sponsors of TVIW 2017

We thank the generous sponsors, supporters, and friends of the TVIW who have gotten us this far with their time and money. Originally sponsored by the Ultimax Group, Inc., we appreciate the 2017 support of:

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We also thank our many previous sponsors and friends in previous TVIW Conferences:

- British Interplanetary Society
- Centauri Dreams blog
- International Space University
- Barbara Jackson and Robert Kennedy
- Carol and Les Johnson
- Martha Knowles and Ken Roy
- John Preston

Step by Step: Building a Ladder to the Stars

Welcome to TVIW 2017

As the Tennessee Valley Workshop begins this collaboration with Starship Century and the Tao Zero Foundation on our fifth Symposium, it is worth noting that the outlines of our interstellar future are brought into focus by the Breakthrough initiatives, pioneering developments for interstellar flight, and these first steps that we take. Let us build that ladder to the stars together!

John Preston, President, TVIW

The Starship Century organization uses sums from sales of our book Starship Century to advance the interstellar idea via public events such as TVIW 2107. Our goal for this meeting is to bring together the interstellar advocacy groups. Now there are real efforts afoot, by the Breakthrough Foundation with the Starshot Project, and by NASA with its funding of a study by Tau Zero. We advocate building toward this vast possibility by uniting our community. Our challenge: to support this great goal together by holding a single meeting per year and including the emerging technical efforts. Getting all our voices together is essential. Thinking about starships means building interstellar –capable technologies on the interplanetary scale first, especially in propulsion.

James Benford and Gregory Benford, Starship Century Directors

TVIW is the event where the latest progress toward interstellar flight is presented and discussed. I hope you will find the event both informative and thought provoking. Feel free to engage in discussions. In the interest of advancement, critiques of the presented works are welcome, especially if offered in writing (email) along with citing any relevant sources of information. Such exchanges help improve the quality of the works.

Marc G. Millis, Tau Zero Foundation Director

ON LINE ACCESS

There should be current wifi access information for this week at the Embassy Suites included in your welcome bag. If you don't happen to have that information handy and you need wifi access, please check with the hotel front desk to find out the credentials for getting on-line. If you are not a guest of the hotel, let them know that you are a TVIW attendee and they will provide you with the information needed for gaining wifi access.

While at TVIW this Weekend, please feel free to visit our Twitter and Facebook Pages.

Twitter: TN Interstellar

***To tag TVIW on Twitter, use* @TVIWUS**

Facebook: Tennessee Valley Interstellar Workshop - TVIW

***To tag TVIW on Facebook posts, use* @Tennessee Valley Interstellar Workshop**

The general social media hashtag that the TVIW be using for this week is: #TVIW2017

Feel free to add other hashtags such as

#LadderToTheStars #StepByStep #PioneeringInterstellarFlight #FirstStepontheJourney

The TVIW 2017 Program Book was accurate as of the time of publishing. For up-to-date information for TVIW 2017, please visit www.tviw.us

Working Tracks

Working tracks are collaborative, small group discussions around a set of interdisciplinary questions on an interstellar subject, and will be allocated 2-hour blocks each day for in-depth conversation between participants, led by a track moderator.

Step by Step to the Stars

Moderator, Douglas Loss

This working track will investigate ways to influence society in general to ensure long-term, continuing support for the interstellar effort. Even before determining who will go, and what they will need to take, there are industrial and financial capabilities are needed, both on and off earth, to make interstellar exploration feasible.

In order for interstellar exploration to begin (and continue), there must be deep, long-lasting support from at least a significant portion of terrestrial society, along with the ability to construct and support the vessels needed, and the infrastructure to operate them and their ancillary requirements (communication, consumables, etc.). This working track will consider how this support can be engendered, expanded, and (possibly) institutionalized. Output of the working track will include recommendations on how to start building the infrastructure for societal motivation, mission support, and mission decisions (such as targets, crew, and cargo selection)

Planning for First Contact/SETI – Starting Now!

Moderator, Scott Guerin and Ken Wisian

This working track will discuss the framework for a traveling science exhibition with the working title Extraterrestrial Life & Civilizations: Science and Speculation. The exhibition's conceptual framework might be built around a quote attributed to Arthur Clarke: "Either we are alone in the Universe or we are not. Both are equally terrifying."

The proposed "first contact" scenario is that you are in deep space, beyond ready communication with Earth and therefore have only your immediate resources at hand. You encounter an artificial object of unknown (though not of human) origin… what do you do? What is the plan? How do you avoid starting a conflict, how do you protect humanity's interests? What can you do to establish communication? Earth-based SETI and METI will also be considered.

The outcome of this track would be an exhibition flow diagram outlining the topics, documentation of key messages, diagrams of the interpretive organization, conceptual sketches, and, afterwards, a concept proposal. The proposed exhibition would put visitors into the shoes of scientists, engineers, economists, politicians, and aliens to explore question about cosmology, life, civilization, spaceflight, communication technologies, and the scale of space-time.

The Evolving Role of Security & Intel in Space – Turning Paranoia into Preparation

Moderator, Robert Hampson

This working track will discuss the evolving role of Security and Intelligence in interplanetary and interstellar exploration and colonization. The emphasis will be on "evolving," in other words, how does S&I become thoroughly integrated with exploration goals and missions and not simply become "red shirts" to be expended at whim.

It will also discuss the needs of an interstellar colonization mission, both the composition of the group of colonists, the consumables needed during the voyage, and the materials both biological and industrial needed to construct a viable colony upon arrival in the target star system.

Building a starship is only part of the problem of interstellar colonization. This working track will act as the "S-2" and "S-4" for the mission, determining what the mission needs and how to make it available.

Sagan Meetings

SAGAN MEETINGS are new for TVIW 2017. Carl Sagan famously employed this format for his 1971 conference at the Byurakan Observatory in old Soviet Armenia, which dealt with the Drake Equation. Sagan solicited short presentations from top scientists (e.g. - Freeman Dyson) on each factor in the Equation, followed by a healthy debate and a drive to consensus.

TVIW 2017 will have three separate 2-hour Sagan Meetings, each dealing with a separate topic. Five 10-minute presentations will be accepted for each Sagan Meeting, after which presenters will sit on a panel to engage in a lively discussion and debate with the general audience. The conversations will be recorded and documented for inclusion into the conference proceeding and possible journal publication.

Day 1, Wednesday

Likelihood of Biosignature Detection in the Spectra of Exoplanets

In honor of this format's origins, the first TVIW Sagan Meeting will deal with a variation on the Drake Equation put forth by astronomer Sara Seager. This equation describes the probability of detecting life on alien planets, specifically with a bent toward the detection of biogenic gases in alien atmospheres. This is a considerably less ambitious equation than Drake's, because it doesn't attempt to predict the probabilities of alien intelligence, or the behavior of such intelligent lifeforms. It is nevertheless particularly relevant in today's environment of rapid exoplanet discovery and our impending ability to determine these planet's atmospheric contents. How likely are we to detect biosignatures in the spectra of exoplanets

Day 2, Thursday

Flyby or Deceleration for Interstellar Missions?

Can worthwhile science be accomplished by a flyby interstellar mission? Or conversely, can enough worthwhile science be performed by a fully decelerated interstellar mission to justify increase in cost and time? If BOTH approaches have merit, then what should be the optimal role of each? This has particular relevance in light of recently-published work promoting each.

Day 3, Friday

500 AU Focal Missions: Arguments For and Against

All the proposed interstellar missions take from 40 years (for a flyby) to 100 years (for a decelerated mission). For most of this time, the vessel is so far from Earth that round-trip communications are measured in years, so the vessel has to be mostly self-sufficient. Voyager has survived for over 30 years thanks to its simplicity alone, with few moving parts. The Daedalus team proposed a pair of autonomous R2D2 robots to maintain the vessel. Firefly relies on redundancy and some on-board repair using 3D printing and a Canada arm. How can a vessel be designed to survive this long? How too can we ensure longevity for the organization here on Earth that manages the mission?

Discussion Groups

Discussion Groups are for those not participating in the working tracks or Sagan Meetings and offer opportunities for free form discussion of subjects of mutual interest to attendees. They are unstructured and no specific output is expected although it is hope that these groups might generate teams and/or topics that would lead to future Working Tracks and possible collaborative efforts in the interstellar field. Coffee, pen, and paper will be provided. An expanded list of possible topics will be available each day of the Symposium and anyone wishing to propose a topic is free to do so. David Fields will be the onsite contact.

TVIW 2017 Schedule

Tuesday, October 3, 2017

8:30 am	Registration opens on the second floor balcony.
9:00 am	Seminars in second floor meeting rooms
	Conflict in Space, presented by Maj. Brent Ziarnick, USAFR *Madison boardroom*
	Laser Propulsion: An Introduction to Laser Propulsion and Assessment of Relevant Current Technologies, presented by Edward E. (Sandy) Montgomery *Redstone boardroom*
10:30 am	Coffee break on second floor balcony
12:00 noon	Lunch break
1:00 pm	Seminar in second floor meeting room:
	Human Life in Space – Separating Reality from Wishful Thinking, presented by Dr. Robert E. Hampson *Madison boardroom*
	Tour of United Launch Alliance facility, Decatur, AL [pre-registered guests only]
4:00 pm	Registration opens in the Ballroom lobby
5:00 pm	Opening Reception in the main Ballroom; Sponsored by Baen Books

Wednesday, October 4, 2017

8:00 am	Introduction and Welcome by Symposium Chair *Les Johnson (TVIW/author)*
	Welcome to Breakthrough Star Shot *Jim Benford, Starship Century*
8:30 am	Are We Alone? – Searching For Life in the Universe *Pete Worden*
9:15 am	Breakthrough Star Shot System Model and Trade Studies *Kevin Parkin*
10:00 am	Coffee Break in Ballroom Foyer
10:30 am	Star Shot Laser Driver *Robert Fugate*
11:15 am	Our First Starships: Sails & Payloads for Star Shot *Jim Benford*
12:00 noon	Data Return from Star Shot Probes: Live from Alpha Centauri *David Messerschmitt*
12:45 pm	Lunch provided in the hotel atrium restaurant
1:45 pm	Session A: Wafersat Trajectories *Al Jackson*
	Session B: Dust Impact Hazard *Robert London and James Early*
2:15 pm	Session A: NEA Guidance *Benjamin Diedrich*
	Session B: Mission Concept to Exoplanets *Stacy Weinstein-Weiss*
2:45 pm	Coffee Break in Ballroom Foyer
3:15 pm	**Breakout Sessions**
	Working Tracks:
	Planning for First Contact/SETI Scott Guerin and Ken Wisian *Madison boardroom*

Wednesday, October 4, 2017 *continued*

3:15 pm Working Tracks:

The Evolving Role of Security & Intel in Space – Turning Paranoia into Preparation
Robert Hampson
Redstone boardroom

Step by Step to the Stars - Doug Loss
Monte Sano boardroom

Sagan meeting:

Likelihood of Biosignature Detection in the Spectra of Exoplanets
Paul Gilster, Greg Benford
Ballroom A

Discussion groups
Ballroom B

7:00 pm Art Show & Reception in the Ballroom lobby and atrium
Featured TVIW 2017 Artist: Chris Wade
Posters presented by: David Fields, Michelle Yan, and Geral Jackson
Music by Valley Converatory

Thursday, October 5, 2017

8:00 am Introduction and Welcome by Symposium Chair *Les Johnson (TVIW/author)*
8:15 am About the Grant *Marc Millis, Tau Zero Foundation*
9:00 am Transportation Supporting a Self-Sustaining Space Economy *Jonathan Barr*
9:30 am Plasma Magnet Sails for Interstellar Flight and Precursor Missions *Jeff Greason*
10:00 am Coffee Break
10:30 am Trapping Charged Particles *Marc Weber*
11:00 am Antimatter Fuel Production *Gerald Jackson*
11:30 am Measurements and Methods *George Hathaway*
12:00 noon Lunch provided in the hotel atrium restaurant
1:00 pm Session A: Fission Fragment *Pauli Laine*
Session B: The Problem of Alien Life *Ken Roy*
1:30 pm Session A: Direct Fusion Drive *Gary Pajer*
Session B: Worldship Conflict *Ore Koren*
2:00 pm Session A: Nuclear Lessons *Brent Ziarnick*
Session B: TBA *Giancarlo Genta*
2:30 pm Coffee Break
3:00 pm **Breakout Sessions**

Working Tracks:

Planning for First Contact/SETI
Scott Guerin and Ken Wisian
Madison boardroom

The Evolving Role of Security & Intel in Space – Turning Paranoia into Preparation
Robert Hampson
Redstone boardroom

Step by Step to the Stars
Doug Loss
Monte Sano boardroom

Sagan meeting:

Flyby or Deceleration for Interstellar Missions?
Gerald Jackson, Stacy Weinstein-Weiss, David Messerschmitt
Ballroom A

Discussion groups
Ballroom B

6:00 pm Public event at US Space and Rocket Center (Biergarten starts at 4:30 pm)
7:00 pm Pass the Torch talk: The Search for Ourselves Among the Stars *Dr. Andrew Siemion*

Friday, October 6, 2017

8:00 am Introduction and Welcome by Symposium Chair *Les Johnson (TVIW/author*)

8:15 am Leadership Panel:

Dr. Pete Worden (Moderator), Breakthrough Star Shot Exec. Director
Congressman Mo Brooks, R-AL
Congressman John Culberson, R-TX
Lt. General Seven Kwast, USAF
Dr. Paul McConnaughey, NASA MSFC Associate Director

9:30 am Humanity's First Explicit Step in Reaching Another Star:
The Interstellar Probe Mission – 200 AU Within 40 Years *Pontus Brandt*

10:00 am Coffee Break

10:30 am Direct Multipixel Imaging of an Exo-Earth with a Solar Gravitational Lens *Slava Turyshev*

11:00 am Solar Gravity Lens Critique *Geoffrey Landis*

11:30 am Enabling Interstellar Missions *Philip Lubin*

12:00 noon Lunch on your own

1:00 pm Session A: Intersellar Solar Sailing *Olga Starinova*
Session B: Exoplanets *Angelle Tanner*

1:20 pm Session A: Space Tow Sails *Sandy Montgomery*
Session B: Worldship Ethics 101 *James Schwartz*

1:40 pm Session A: Diffractive Sails *Grover Swartzlander*
Session B: In-Space Manufacture *Tracy Prater*

2:05 pm, Session A: Pulsed Magnetic Nozzle *Jason Cassibry*
Session B: METI *Kelly Smith*

2:30 pm Coffee Break

3:00 pm **Breakout Sessions**

Working Tracks:

Planning for First Contact/SETI
Scott Guerin and Ken Wisian
Madison boardroom

The Evolving Role of Security & Intel in Space – Turning Paranoia into Preparation
Robert Hampson
Redstone boardroom

Step by Step to the Stars
Doug Loss
Monte Sano boardroom

Sagan meeting:

500 AU Focal Missions: Arguments For and Against
Greg Matloff, Geoff Landis, Slava Turyshev, Pontus Brandt
Ballroom A

Discussion groups
Ballroom B

5:00 pm Concluding Reports for the Working Tracks

5:30 pm Meeting Summary and Closure, *Paul Gilster, Centauri Dreams*

8:00 pm Public Event: SF Writers' Panel
Larry Niven, Allen Steele, Greg Benford, James Cambias, Geoff Landis
Main Ballroom

Saturday, October 7, 2017

8:00 am Forward Planning meeting in the Mayor's Suite (TVIW/TZF/SC)

10:00 am Tour of USSRC (on your own)

TVIW Public Outreach

Please join us for our public events on Thursday and Friday evenings.

U.S. Space & Rocket Center

Thursday Evening
October 5, 2017
7:00 p.m.

As part of the joint TVIW and U.S. Space & Rocket Center (USSRC) Pass the Torch series at the USSRC, TVIW 2017 is proud to announce that Dr. Andrew Siemion will be speaking on 'The Search for Ourselves Among the Stars'. Dr. Siemion is an astrophysicist at the University of California (UC), Berkeley and serves as Director of the UC Berkeley Center for Search for Extraterrestrial Intelligence (SETI) Research.

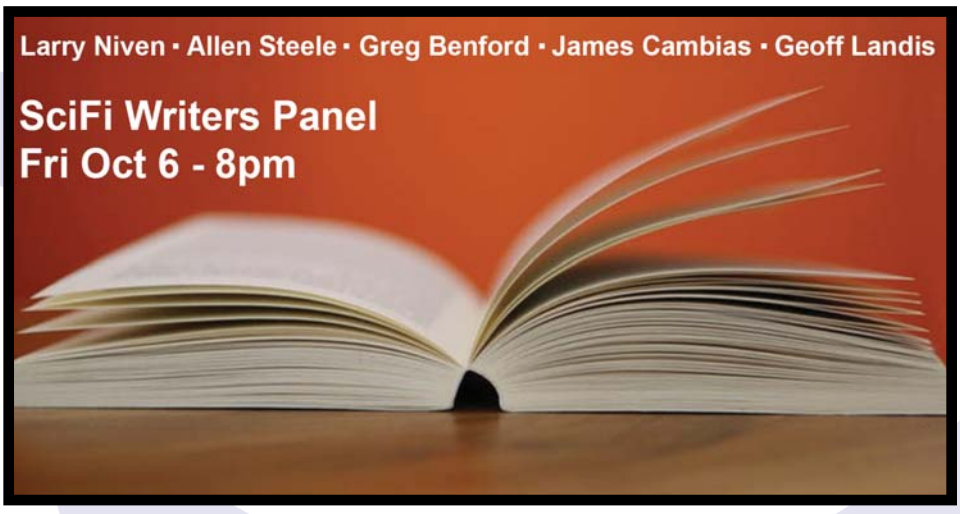
This talk will follow the Biergarten at the USSRC. Come join us for dinner and Dr. Siemion's talk, which will be in the National Geographic Theater of the USSRC Davidson Center for Space Exploration.

Please join the attendees of the 5th TVIW as they bring the dream of future interstellar travel to reality. Scientists and engineers from around the world are gathered to discuss how humanity might one day reach the stars. Check out www.RocketCenter.com for more information on the USSRC.

Access to the USSRC Biergarten at the Davidson Center is via the Saturn V that is standing next to the Davidson Center, not through the museum entrance.

Science Fiction Writers Panel

Friday Evening
October 6, 2017
Embassy Suites Hotel



We will be presenting a panel discussion by renowned science fiction writers to address the question: What are possible futures for the development of interstellar travel, given what you have seen at this symposium?

The panel will include: Larry Niven, Allen Steele, Greg Benford, James Cambias, and Geoff Landis.

There will be a meet & greet and book signing afterwards.

	Tuesday 3-Oct-2017 **TVIW**	Wednesday 4-Oct-2017 **Starship Century**	Thursday 5-Oct-2017 **Tau Zero Foundation**	Friday 6-Oct-2017 **TVIW**	Saturday 7-Oct-2017 **TVIW**	
	Seminars/Tours **1) Conflict in space** **2) Laser prop intro** **3) Humans in space**	**Breakthrough Star Shot**	**Pioneering Interstellar Flight**	**First Step on the Journey**	**Recovering & Planning**	
7:00 AM 7:30 AM	**Breakfast** (provided for room guests)	**Breakfast** (provided for room guests)	**Breakfast** (provided for room guests)	**Breakfast** (provided for room guests)	TVIW/TZ/SC **Breakfast**	7:00 AM 7:30 AM
8:00 AM		Welcome: **Les Johnson**, General Chair	Welcome: **Les Johnson**, General Chair	Welcome: **Les Johnson**, General Chair	TVIW/TZ/SC **Forward Planning**	8:00 AM
8:30 AM	**Seminar Registration** On 2nd Floor	Welcome: **Jim Benford**, Starship Century **Pete Worden** - Are We Alone?	**Marc Millis** - About the Grant	**Leadership Panel** Breakthrough Star Shot Exec. Dir. Pete Worden Congressmen John Culberson, Mo Brooks		8:30 AM
9:00 AM	**Morning Seminar** Conflict in Space / **Morning Seminar** Laser Propulsion		**Jonathan Barr** - Transportation Supporting a Self-Sustaining Space Economy	Lt. General Steven Kwast, Air University, MAFB NASA MSFC Assoc. Director Dr. Paul McConnaughey		9:00 AM
9:30 AM		**Kevin Parkin** - Breakthrough Star Shot System Model and Trade Studies	**Jeff Greason** - Missions Enabled by Plasma Magnet Sails	**Pontus Brandt** - Interstellar Precursors		9:30 AM
10:00 AM		**Coffee Break**	**Coffee Break**	**Coffee Break**	**Hospitality Suite Closes**	10:00 AM
10:30 AM	**Coffee Break**	**Robert Fugate** - Star Shot Laser Driver	**Marc Weber** - Trapping Charged Particles	**Slava Turyshev** - Direct Exoplanet Imaging via Solar Gravity Lens	**Space & Rocket Center Tour** (on your own)	10:30 AM
11:00 AM			**Gerald Jackson** - Antimatter Fuel Production	**Geoffrey Landis** - Solar Gravity Lens Critique		11:00 AM
11:30 AM		**Jim Benford** - Our First Starships	**George Hathaway** - Measurements and Methods	**Philip Lubin** - Enabling Interstellar Missions		11:30 AM
12:00 PM 12:30 PM	**Lunch** Consuite will be Open	**David Messerschmitt -** Data Return from Star Shot Probes	**Lunch** (provided, in atrium dining area)	**Lunch** (on your own)		12:00 PM 12:30 PM
1:00 PM 1:30 PM	**Afternoon Seminar** Humans in Space / **ULA Tour** (pre-registered guests only)	**Lunch (12:45-1:45)** (provided, in atrium dining area) **Al Jackson** Wafersat Trajectories / **R. London & J. Early** Dust Impact Hazard **Benjamin Diedrich** NEA Guidance / **Stacy Weinstein-Weiss**: Exoplanet Mission Concept	**Pauli Laine** Fission Fragment Rockets / **Ken Roy** Problem of Alien Life **Gary Pajer** Direct Fusion Drive / **Ore Koren** Worldship Conflict **Brent Ziarnick** Nuclear Lessons / **Giancario Genta** TBA	**Olga Starinova** Interstellar Solar Sailing / **Angelle Tanner** Exoplanets **Sandy Montgomery** Space Tow Sails / **James Schwartz** Worldship Ethics 101 **Grover Swartzlander** Diffractive Sails / **Tracy Prater** In-Space Manufacture **Jason Cassibry** Pulsed Magnetic Nozzle / **Kelly Smith** METI		1:00 PM 1:30 PM
2:00 PM 2:30 PM	**Coffee Break**	**Coffee Break**	**Coffee Break**	**Coffee Break**		2:00 PM 2:30 PM
3:00 PM 3:30 PM		**Working Tracks**: First Contact/SETI; *Security & Intel in Space*; Step by Step to the Stars **Sagan Meeting**: Likelihood of Biosignature Detection in the Spectra of Exoplanets (Gilster, G. Benford, Tanner) **Discussion Groups**	**Working Tracks**: First Contact/SETI; *Security & Intel in Space*; Step by Step to the Stars **Sagan Meeting**: Flyby vs. Deceleration for Interstellar Missions (Weiss, Messerschmitt, G. Jackson, TBA) **Discussion Groups**	**Working Tracks**: First Contact/SETI; *Security & Intel in Space*; Step by Step to the Stars **Sagan Meeting**: 500 AU FOCAL Missions: Arguments for and Against (Matloff, Landis, Turyshev, Brandt) **Discussion Groups**		3:00 PM 3:30 PM
4:00 PM 4:30 PM	**Conference Registration** In ballroom lobby (hospitality suite open)					4:00 PM 4:30 PM
5:00 PM 5:30 PM		**Break (dinner on your own)**	**Break**	**Working Tracks - Concluding Reports** **Paul Gilster** Meeting Summary & Closure		5:00 PM 5:30 PM
6:00 PM 6:30 PM	**Baen Reception** Hotel Ballroom **(hors d'euves included)**		**Symposium Event** US Space & Rocket Center Biergarten (opens at 4:30 pm) **(dinner on your own)**	**Informal Social** in Hospitality Suite **(dinner on your own)**		6:00 PM 6:30 PM
7:00 PM 7:30 PM		**Art Show & Reception** Marshall Room **(hors d'euves included)**	7:00 pm - Pass The Torch talk: The Search for Ourselves Among the Stars, **Andrew Siemion**, UC Berkeley (must leave by 9:00pm)			7:00 PM 7:30 PM
8:00 PM 8:30 PM				**SciFi Writers Panel** Larry Niven Allen Steele Greg Benford James Cambias Geoff Landis		8:00 PM 8:30 PM
9:00 PM 9:30 PM						9:00 PM 9:30 PM

TVIW 2017 Guests & Speakers

Jonathan Barr is an Engineer in Advanced Programs for United Launch Alliance. Jon started his career at General Dynamics, working an array of missiles, reusable space vehicles, and launches.

After a career switch to Boeing in 1997, he supported special issues resolution for the Systems Engineering & Integration Team during Delta IV development, and he was the chief systems engineer during the early development of an Advanced Upper Stage for Delta IV. With the formation of ULA, Jon bought his combined experience with both Atlas and Delta launch systems. Recently Jon was the program manager of the ACES Upper Stage development. He is currently working on enhancements to the ACES stage to increase mission duration and add new capabilities.

Gregory Benford is a professor of physics at the University of California, Irvine. He is a Woodrow Wilson Fellow, a fellow of the American Physical Society, and was Visiting Fellow at Cambridge University, UK, and the Universities of Turin and Bologna.

In 2006 he co-founded two biotech companies working on human longevity. He is the CEO of Methuselah Flies LLC and Board member of Genescient Corporation and LifeCode LLC.

In 1995 he received the Lord Prize for contributions to science. His research in both astrophysics and plasma physics has been supported by NSF, NASA, AFOSR, DOE and other agencies. He is an ongoing advisor to NASA, DARPA (Defense Advanced Research Projects Agency) and the CIA.

He is the author of 31 novels, six collections of his short stories, and 8 anthologies.

James Benford, Microwave Sciences, is Sail System Director of Breakthrough Star Shot and President of Microwave Sciences, Inc. in Lafayette, California. His interests include high power microwave systems from conceptual designs to hardware, microwave source physics, electromagnetic power beaming for space propulsion, experimental intense particle beams and plasma physics.

He is co-author of the textbook, High Power Microwaves, 3rd Edition (Taylor & Francis, 2016). He has a PhD in Physics at the University of California San Diego. He is an IEEE Fellow and an EMP Fellow.

Pontus C. Brandt, Johns Hopkins Applied Physics Laboratory, has served as Senior Professional Staff Scientist at APL and the Swedish Institute of Space Physics. At APl he was responsible for analyzing the data from the HENA instrument onboard IMAGE. Dr. Brandt received his PhD in space plasma physics from the Swedish Institute of Space Physics in Kiruna, Sweden in December 1999. There he worked on the Swedish microsatellite Astrid, and the ENA imager PIPPI as well as on simulations of the Hermean magnetosphere.

Congressman Mo Brooks, R-AL. As the Representative for Alabama's 5th Congressional District, the Congressman proudly represents the people of North Alabama (including the greater Huntsville aerospace community) and serves on three important committees: Armed Services; Science, Space, and Technology; and Foreign Affairs. After many years of White House neglect, Congressman Brooks has a renewed sense of optimism for the space program under the current Administration.

Congressman Brooks strives to ensure that these programs remain on a steady path to success. He was excited to see the Trump Administration prioritize deep space exploration in its first year budget request, demonstrating that he has the full intention of challenging America's space program to reach farther into space than ever before through the use of vehicles like the Space Lunch System and Orion. Congressman Brooks knows that there is more work to do to ensure the preeminence of our nation's space program. That is why he is committed to doing whatever is necessary to promote our nation's space objectives via Congressional hearings, meetings, and letters to key appropriators, and will continue to monitor NASA's progress on these critical programs.

Dr. Jason Cassibry obtained a B.S. in aerospace engineering from the University of Missouri in Rolla in 1997, his M.S. in aerospace engineering from the University of Illinois in Champaign-Urbana in 1999, and his Ph.D. in mechanical engineering from The University of Alabama in Huntsville (UAH) while performing research at NASA MSFC in 2004. His research involved numerical modeling of magnetized target fusion for propulsion. From 2003-2004, he served as a research engineer in the Propulsion Research Center (PRC) at UAH and after receiving his Ph.D. became an assistant research professor.

James L. Cambias writes science fiction and designs games. Originally from New Orleans, he was educated at the University of Chicago and lives in western Massachusetts. His first novel, A Darkling Sea, was published by Tor Books in 2014, followed by Corsair in 2015. His short stories have appeared in The Magazine of Fantasy & Science Fiction, Shimmer, Nature, and several original anthologies — including the collection Hieroglyph, edited by Kathryn Cramer and Ed Finn. Most recently, his story "Treatment Option" was featured on the X-Prize foundation's "Seat 14C" Web site. Mr. Cambias has written for Steve Jackson Games, Hero Games, and other roleplaying publishers, and is a partner in Zygote Games, a small company specializing in science and nature-based games. His most recent game title is Weird War I, from Pinnacle Entertainment Group. His blog is at: www.jamescambias.com.

Congressman John Culberson, R-TX, Washington Perspectives on Interstellar Research. As Chair of the House Commerce, Justice, Science, and Related Agencies (CJS) Appropriations Subcommittee, which funds NASA, the Congressman is focused on ensuring that NASA receives the funding and guidance neces-

sary to maintain US leadership in space. He supports additional funding for NASA and believes it is crucial for the agency to have a clear vision that is driven by science and inspires our young people to study science and mathematics. The Space Launch System heavy-lift rocket and Orion multi-purpose crew vehicle will be critical components of our capability to return to the moon or lunar orbit, to reach Mars, and to go beyond.

Rep. Culberson has authored the Space Leadership Preservation Act to make NASA more professional and less political by establishing a long-term NASA Administrator who overlaps presidential administrations, creating a board to drive the vision for NASA exploration, and allowing NASA to develop spacecraft using long term contracts.

Ben Diedrich has been interested in solar sails since reading the anthology "Project: Solar Sail", and wrote a paper in high school on the history of sailing and its potential future in space. He was awarded a bachelors and masters in Aeronautics and Astronautics from the University of Washington where he specialized in dynamics and controls. His masters thesis was on solar sail attitude control by shifting the center of mass. After college, he worked for two years at Lockheed Martin in Sunnyvale, California, on spacecraft control systems using torque rods, reaction wheels, thrusters, and control momentum gyros.

He currently lives in Huntsville, Alabama, where he spent the last year and a half on the Near Earth Asteroid (NEA) Scout solar sail mission, designing a solar torque momentum management system for the reaction wheels. He currently works on dynamic simulations for the Space Launch System (SLS).

Dr. Jim Early received his Ph.D. in Aeronautics & Astronautics from Stanford University in 1973. He worked some summers at NASA Goddard Space Flight Center, and went on to work for several aircraft companies. He spent most of his career at Lawrence Livermore National Laboratory, retiring as the Deputy Assistant Program Leader for Short Pulse Lasers Applications & Technology. He has had papers published in SPIE proceedings, Journal of Spacecraft & Rockets, and the Journal of British Interplanetary Society, as well as many internal papers on the AVLIS project.

Dr. David Fields (Ph.D., Physics, Univ. of Wisconsin), TVIW Director at Large. David is the Director of the Tamke-Allan Observatory, the ORION founder/president and Senior Researcher at I4IS. He has presented papers at the 2011, 2013, 2014, and 2016 Symposia of TVIW. 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.

Col. Kevin Fritz Fotovich is a Senior Logistics Engineer and Multimedia Specialist. He currently works for Raytheon, and has worked directly with the US ARMY as an acquisition logistics specialist for well over a decade.

His passion is creating interesting graphic layouts and design, such as the ***TVIW Program Book*** that is currently in your hands.

In early 2017, Fritz was awarded the title of Honorary Colonel by the Governor of Alabama in recognition for his many years of volunteer work, especially for the time and dedication he has spent for the Veterans of the United States of America.

Dr. Robert Q. Fugate is internationally recognized as the first to demonstrate the concept of laser guide star adaptive optics and to develop and apply needed technologies to make the concept practical on large ground-based telescopes. Dr Fugate spent over 35 years in the Air Force Research Laboratory and retired as the Senior Scientist for Atmospheric Compensation in 2006.

From early 2006, he was the Senior Technical Advisor on the staff of New Mexico Tech and retired with Emeritus status at the end of 2011. He now serves as a part-time consultant, speaker, and advisor to the Air Force and other US Government agencies and private organizations. His latest endeavor is serving on the advisory board for Breakthrough Star Shot and as Chairman of the Laser Subcommittee.

Paul Gilster, Author, ***Centauri Dreams***, is a full-time writer who focuses on space technology and its implications. He is one of the founders of the Tau Zero Foundation. 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

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.

Jeff Greason, Board Chairman, Tau Zero Foundation, has over 25 years' experience managing innovative technical project teams at XCOR Aerospace, Rotary Rocket and Intel Corporation, and now as CEO of Agile Aero. As president and co-founder of XCOR, he led the engineering team that developed over 14 different long-life, highly-reusable liquid-fueled rocket engines.

He has also worked on a low-cost liquid propellant piston pump, and two manned reusable rocket aircraft – the EZ-Rocket and the X-Racer, which broke all previous barriers for low cost and rapid reflight of rocket vehicles with 66 successful flights between them.

Jeff is a recognized expert in Reusable Launch Vehicle (RLV) Regulations. He has been a member of the COMSTAC RLV working group since 2000 and presently serves on the full COMSTAC.

Mr. Greason holds 25 U.S. patents. He graduated with honors from the California Institute of Technology in Pasadena and currently lives in Midland, Texas.

Scott Guerin For over 35 years, Mr. Guerin has participated in all aspects of museum planning, exhibition design, and media development. He has led interdisciplinary teams that have conceived, planned, designed, and produced some of the most complex interpretive projects in the world.

More recently he has focused on design of digitally-based experiences in the built environment and co-authored "Citizen SETI" in

Centauri Dreams. Currently he is working on new articles and a website exploring his interest the Fermi Paradox through models, animations, and illustrations.

A life-long science fiction fan, he studied art at the University of Wisconsin, Madison (BS, 1978), where he worked as an illustrator at the molecular biology/biophysics laboratory. He currently lives in Brooklyn, New York.

Robert E. Hampson, Ph.D., TVIW Chair of Working Tracks - Dr. Hampson received his B.S. in Biology from the University of Texas at San Antonio in 1979, M.S. in Biology from Lehigh University in 1981, and Ph.D. in Physiology and Pharmacology from Wake Forest University in 1988. His primary research interest is in how the brain processes information involved in memory, and how that information can be decoded by means of neurophysiological recording and brain-to-computer interfaces.

Dr. Hampson is currently a Professor in the Department of Physiology and Pharmacology at Wake Forest School of Medicine, an Associate Editor for the Journal of Neuroscience Methods, and a regular reviewer for NIH and NASA.

George D. Hathaway, P.E., earned his Electrical Engineering degree in 1974 from the University of Toronto. He is a Registered Professional Engineer and member of several societies including SSE and IEEE. He lectured for many years at the Ontario College of Art and Design teaching computer graphics, then in its infancy. In addition, he has mentored students, educators and specialists at various levels on technology and physics, concentrating on leading-edge research and applications.

He organized and hosted two International Symposia on Non-Conventional Energy Technology (Toronto, 1981 and Atlanta 1983) highlighting novel and advanced energy and propulsion technologies and has given oral and written presentations at numerous technical conferences.

Dr. Al Jackson, IV, PH.D., NASA JSC (Retired), earned his doctorate in relativistic astrophysics from UT-Austin in 1975. At NASA's Johnson Space Center, Houston, He performed,: flight crew training, mission planning software, orbital debris modeling, and engineering simulation. Dr. Jackson has research experience and published articles in planetary physics, astrodynamics of interplanetary dust and earth orbital debris, and interstellar flight.

Dr. Gerald Jackson attended Cornell University in 1981 where he received his doctorate in the field of accelerator physics. At the Fermi National Accelerator Laboratory ("Fermilab") from 1985 until 2000 he was instrumental in improving the performance of the Tevatron program.

His technical contributions to, and leadership of, the Recycler project won him the 1999 IEEE Particle Accelerator Science and Technology Award and earned him the status of Fellow in the American Physical Society. Along with Dr. Steven Howe, in 2002 Dr. Jackson founded Hbar Technologies, LLC ("Hbar Tech"), a company dedicated to the commercialization of antimatter.

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

Ore Koren - Exploration and complex systems have always interested Ore Koren. He is a Ph.D. candidate in political science at the University of Minnesota, where he also received an MS in applied economics. A 2016-2017 Jennings Randolph Peace Scholar at the United States Institute of Peace, Koren studies how local environmental, political, and economic factors shape violence within the state.

Koren's published projects include employing satellite imagery of nighttime light levels to measure state capacity and its connection to civil war, exploring how food security concerns relate to political violence on the local level, and using resource-related factors to explain and predict genocide.

When not engaged in his academic and policy research, Koren likes to play guitar, read about advances in technology and astronomy, and write science fiction short stories.

Lt. General Steven L. Kwast, USAF, is Commander and President, Air University, Maxwell Air Force Base, Alabama. He leads the intellectual and leadership center of the U.S. Air Force, graduating more than 50,000 resident and 120,000 non-resident officers, enlisted and civilian personnel each year. He holds a Bachelor's degree in Astronautical Engineering from the U.S. Air Force Academy in Colorado Springs and a Master's degree in Public Policy from the John F. Kennedy School of Government at Harvard University. He was assigned to undergraduate pilot training where he earned his pilot wings in June 1989.

General Kwast has served as military aide to the vice president and completed a National Defense Fellowship with the Institute for the Study of Conflict, Ideology and Policy at Boston University, Massachusetts.

Geoffrey Landis was born in Detroit, Michigan. After going to college at MIT and graduating with degrees in Physics and Electrical Engineering, he worked in the Boston area for five years.

After receiving his Ph.D. in physics from Brown University, Dr. Landis worked as a postdoctoral researcher at the NASA Lewis Research Center (now renamed NASA Glenn), then worked as a NASA contractor, and finally as senior scientist at the Ohio Aerospace Institute, before accepting his current job as a civil-service scientist in the Photovoltaics and Power Technology Branch at NASA Glenn Research Center in Cleveland, where he works on Mars exploration with the Mars Exploration Rovers.

He currently lives Berea, Ohio with cats named Azrael and Tyrael, several teddy-bears, more books than you can count in a year, and no goldfish. He is married to science fiction writer Mary A. Turzillo.

Dr. Richard A. London holds a B.A. in Physics from Oberlin College and a Ph.D. in Physics and Astrophysics from the University of Colorado. He completed a Postdoctoral Fellowship at the Harvard-Smithsonian Center for Astrophysics. Dr. London is currently a physicist in the Defense Programs Division at the Lawrence Livermore National Laboratory. He is an expert in the

theoretical and computational studies of the interaction of electromagnetic and particle radiation with matter.

He has performed research in the areas of astrophysics, x-ray lasers, inertial confinement fusion, laser driven light sails, and the physics of high energy density matter. He is a Fellow of the American Physical Society, holds 9 patents, and has published 200 scientific papers.

Doug Loss, TVIW Chair of Registration, 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. Doug currently lives in Maryville, TN with his wife Ruby. He's been heard to say, "I live in the foothills of the Smokies; some days it's all I can do just to decide to go to work."

Philip Lubin is a professor of Physics at UC Santa Barbara whose primary research has been focused on studies of the early universe in the millimeter wavelengths bands as well as applications of directed energy for planetary defense and relativistic propulsion. His group has designed, developed and fielded more than two dozen ground based and balloon borne missions and helped develop two major cosmology satellites.

He is director of the NASA Starlight program, currently in a Phase II whose goal is to use directed energy for humanity's first interstellar missions. He is also concept director for the Breakthrough Starshot program whose goals are also to achieve relativistic flight with miniature spacecraft. He is co-recipient of the 2006 Gruber Prize in Cosmology along with the COBE science team for their groundbreaking work in cosmology.

Dr. Paul McConnaughey, Associate Director, NASA Marshall Space Flight Center, earned his bachelor's degree from Oregon State University in Corvallis, and his master's degree and doctorate from Cornell University in Ithaca, New York. After earning his doctorate, McConnaughey spent three years as a professor of soil physics and mathematics at Mississippi State University in Starkville.

He joined Marshall in 1986 as an engineer in the Systems Dynamics Laboratory. In 1998, McConnaughey was named NASA's deputy manager for the Military Spaceplane Technology Office. In 2007 he was selected as Marshall's chief engineer. He then served as the director of System Engineering and Integration and the chief engineer of the Exploration Systems Development Division at NASA Headquarters in Washington.

McConnaughey also received the Presidential Rank Award for Meritorious Executive in 2011, the second-highest award conferred by the president of the United States.

Dr. David Messerschmitt is the Roger A. Strauch Professor Emeritus of Electrical Engineering and Computer Sciences (EECS) at the University of California at Berkeley. The first ten years of his career was spent at Bell Laboratories, where he participated in the exploratory development of digital communications. At Berkeley he has done research in digital communications and audio and video encoding, and has served as the Chair of EECS and the Interim Dean of the School of Information.

His doctorate in Computer, Information, and Control Engineering is from the University of Michigan, and he is a Life Fellow of the IEEE, a Member of the National Academy of Engineering, and a recipient of the IEEE Alexander Graham Bell Medal recognizing "exceptional contributions to the advancement of communication sciences and engineering".

Joseph E. Meany, Ph. D. - TVIW Chair of IT. Although originally from Keene, NH, Joe started with TVIW in 2014 while still a graduate student at The University of Alabama. Since joining at TVIW 3, he has been active on the organizing committee for both TVIW 4 and 5.

While at UA, his research focused on the development and manufacture of conductive carbon-based molecules in electrical circuits, a quickly developing field within nanotechnology. In addition to academic publications, he has written articles for Baen Books with particular focus for nanotechnological applications in space.

Joe also travels to conferences and conventions as The Crimson Alkemist to inform and excite people about the promises and potential behind the latest discoveries in chemistry and material science. As he currently calls Atlanta, GA home, his favorite convention to present at is DragonCon over Labor Day weekend each year.

Marc Millis, Founder, Tau Zero Foundation, lead NASA's visionary "Breakthrough Propulsion Physics" project and created the milestone book, Frontiers of Propulsion Science, a compendium of scholarly research on propellantless space drives and faster-than-light flight. Earlier in his NASA career, Millis designed ion thrusters, electronic instrumentation for rockets, cryogenic propellant equipment, and even a cockpit display for free-fall aircraft flights. After 31 years with NASA, he retired in 2010 to devote full time to interstellar research and education via the Tau Zero Foundation.

Edward "Sandy" Montgomery, TVIW Director at Large, has also 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.

Larry Niven graduated Washburn University, Kansas, June 1962: BA in Mathematics with a Minor in Psychology. Half the university was scattered to the winds by a tornado a month after he left. They later gave him a D. Litt., an honorary doctorate in Letters. His first story publication: ***The Coldest Place***, Worlds of If, December 1964.

He met Marilyn Joyce Wisowaty at the Nycon World Science Fiction Convention, 1967. Married September 6, 1969. No children. They reside in Chatsworth, California.

He has written fiction at every length, and speculative articles, speeches for high schools and colleges and conventions, television scripts, political action in support of the conquest of space, graphic novels, and a couple of comic book universes. He has collaborated with a wide variety of writers.

Larry grew up with dogs: Keeshonds, the breed his mother raised and shaped for sixty years. He lives with a cat, and borrows dogs to hike with. He has a passing acquaintance with raccoons and ferrets. He credits associating with nonhumans for certainly gaining him insight into alien intelligences.

Larry has written on computers since 1978.

Dr. Gary Pajer is the Senior Scientist at Princeton Satellite Systems. He is also Adjunct Professor of Physics at The College of New Jersey in Ewing. Prior to joining PSS in 2010, Dr. Pajer was on the full time faculty of Rider University, and before that he was a member of the technical staff at Sarnoff Corporation in Princeton, New Jersey. His expertise is in the physics and application of optical devices. Hardware that he had a hand in designing and building can be found in the Cassini, SOHO, and Defense Meteorological Satellite Program spacecraft, and in threat detection systems for fighter aircraft.

Dr. Pajer holds a PhD from the Univeristy of Pennsylvania, and an S.B. degree from MIT.

Dr. Kevin L. G. Parkin, Parkin Research LLC, Breakthrough Star Shot System Model and Trade Studies Systems, founder of Parkin Research LLC and the inventor of the microwave thermal rocket.

In 2005 he was awarded the Korolev Medal by the Russian Federation of Astronautics and Cosmonautics for his ground-breaking work in microwave thermal propulsion.

In 2007, Dr. Parkin founded the Mission Design Center (MDC) at NASA Ames. From 2009 to 2015, he was a Research Faculty member at Carnegie Mellon Silicon Valley.

He is a member of the Institute of Physics (IOP) and holds an M.Phys. from the University of Leicester (1999), an M.S. from Caltech (2001) and a Ph.D. from Caltech (2006).

Dr. Tracie Prater is an aerospace engineer in the Materials and Processes Laboratory Engineering Support Office at NASA Marshall Space Flight Center. She is currently the materials discipline lead engineer for NASA's in-space manufacturing project and serves as a subject matter expert for NASA's Centennial Challenge on 3D Printing of Habitats.

Prior to joining NASA in 2013, she was a manufacturing engineer at United Launch Alliance. She has a B.S. in Physics from Eastern Kentucky University and an M.S. and Ph.D. in Mechanical Engineering from Vanderbilt University. She is a senior member of the American Institute of Aeronautics and Astronautics (AIAA) and serves in leadership roles with AIAA at the local and regional level. In her spare time, she enjoys SCUBA diving, running, and traveling.

Ken Roy, TVIW Director at Large, is an engineer living and working amidst the relics of the Manhattan Project in Oak Ridge, Tennessee. He invented the "Shell Worlds," concept. In 1997, he made the cover of the prestigious Proceeding of the U.S. Naval Institute for his forecast of anti-ship, space-based, kinetic energy weapons.

With his co-authors R.G. Kennedy and D.E. Fields, has appeared multiple times in JBIS and Acta Astronautica with papers on terraforming and space colonization. He is a graduate of the Illinois Institute of Technology and the University of Tennessee at Knoxville in engineering. He enjoys reading science fiction and books on terraforming.

Dr. James S. J. Schwartz, Ph.D., Wichita State University specializes in philosophy of mathematics, and in the ethical and other philosophical questions raised by space explorations. His publications have appeared in ***Philosophy Mathematica, Environmental Ethics, Ethics, and the Environment, Space Policy***. And in several volumes of Springer's ***Space and Society*** series. He is co-editor with Tony Milligan of the volume ***The Ethics of Space Exploration.***

Dr. Andrew Siemion is an astrophysicist at the University of California (UC), Berkeley and serves as Director of the UC Berkeley Center for Search for Extraterrestrial Intelligence (SETI) Research. He is jointly affiliated with The Netherlands Institute for Radio Astronomy (ASTRON), Radboud University, Nijmegen, Netherlands and the SETI Institute, Mountain View, California.

Dr. Siemion also serves on the Science@Cal Advisory Board, Co-Chairs the Cradle of Life Science Working Group for the forthcoming Square Kilometer Array telescope and is a member of the Board of Directors of the Foundation for Investing in Research on SETI Science and Technology (FIRSST). Dr. Siemion frequently appears on international television and radio discussing the search for life beyond on Earth and the prospects for detection.

Abigail Sherriff, TVIW Chair of Publications**,** is an Aerospace Engineer with a strong computer science background and an notable record of success in high-profile, competitive research internships and apprenticeships; offering talent for collaborative research paired with technical expertise to drive innovations in human space flight**.**

Dr. Kelly Smith holds a PhD in Philosophy as well as a MS in Biology from Duke University. He is currently an associate professor of philosophy and biological sciences and a Lemon Fellow of the Rutland Institute for Ethics at Clemson University. He is also on the faculty of the University of South Carolina School of Medicine in Greenville, where he oversees their ethics and professionalism curriculum.

His research interests are highly interdisciplinary and have included such diverse areas as the concept of genetic disease; the relationship between religious faith and scientific reasoning; and the ethical implications of biotechnology. His most recent work explores the various social, conceptual and ethical issues surrounding the search for life on other planets as well as space exploration more generally, support from the public, who would potentially be affected by these actions.

Allen Steele is a former journalist who'd worked for newspapers and magazines in Massachusetts, New Hampshire, Missouri, and his home state of Tennessee. Science fiction was his first love, though so he eventually ditched journalism and instead began producing that which made him decide to be a writer in the first place. He has been a full-time SF writer since 1988.

In that time, Allen has published twenty novels and about one hundred short stories. His work has received numerous awards, including three Hugos and the Robert A. Heinlein Award, and has been translated worldwide. He is a former member of the Board of Advisors for the Space Frontier Foundation and the Board of Directors for the Science Fiction and Fantasy Writers of America.

Allen lives in western Massachusetts with his wife Linda and a procession of adopted dogs.

Dr. Grover Swatzlander is the Associate Professor of Imaging Science at the Rochester Institue of Technology, RIT. Prof. Swartzlander is currently exploring experimental and theoretical topics in the field of physical optics (imaging, flying by light, optical vortices). These include sub-resolution imaging, high contrast imaging, vortex phenomena, solar sailing, and radiation pressure forces and torques. He has conducted pioneering research on the optical vortex coronagraph, optical vortices, solitons, coherence theory, optical tweezers, and optical lift. He joined RIT in 2008 after appointments at the University of Arizona, the Worcester Polytechnic Institute, and the US Naval Research Lab.

- Editor-in-Chief of the Journal of the Optical Society of America B (2013 - Present)
- Optical Society of America Fellow (2003)
- NASA NIAC Fellow (2011, 2012)
- Cottrell Scholar (1996)
- NSF Young Investigator (1994)

Dr. Angelle Tanner is an Associate Professor with the MSU Department of Physics & Astronomy. She received her BS degrees and Astronomy and Physics from the University of Arizona and her Masters and PhD in Astrophysics from UCLA. She was a postdoc scholar at Caltech, the Jet Propulsion Laboratory and Georgia State University before coming to MSU.

She is currently developing the Starchive, an open access database of nearby stars which will be used by many upcoming extrasolar planet discovery programs including JWST, TESS, Kepler, LSST and WFIRST. Dr. Tanner hopes to be a primary contributor to the inevitable discovery of life on a nearby, Earth-like planet.

Dr. Slava Turyshev, NASA Jet Propulsion Laboratory, is a physicist at the NASA Jet Propulsion Laboratory, California Institute of Technology, whose areas of research include gravitational and fundamental physics, research in astronomy, astrophysics and planetary science.

He is an expert in spacecraft navigation, solar system dynamics, satellite and lunar laser ranging, planetary research and related technology efforts spanning detectors, instruments and data analysis.

Since 2012 he is an Adjunct Professor at the UCLA's Department of Physics and Astronomy. In 2016 Dr. Turyshev was elected a corresponding member of the International Academy of Astronautics.

Chris Wade, TVIW 2017 Featured Artist, has always taken naturally to art since his early years, but it wasn't until the past five years that he actively began to develop his work in theme and technique as he expanded to other media beyond graphite.

He began his current series about three years ago after a series of recurring dreams of finding abandoned rockets and realizing the profound symbolism in these dreams as related to his own life. He finds inspiration for his art mostly in vivid dreams as well as in the way he viewed the world as a child, seeing the imagination of a child as far more entertaining, vivid and exciting than the reality we tend to live in as adults.

Chris has been at Lowe Mill in Downtown Huntsville, AL, in studio 2052, for almost a year, working simultaneously on many projects at any given time.

Dr. Marc H. Weber spent most of his career annihilating positrons, the antimatter counterparts to electrons. After undergraduate and some graduate studies in his native Germany he was awarded a Fulbright scholarship to come to New York's City College where he heard about opportunities to study antimatter at Brookhaven National Laboratory. For his PhD project he formed a bound state of positrons and electrons called positronium. Dr. Weber's work expanded to study the interactions of positrons and positronium with atoms, molecules surfaces and solids.

Currently, Dr. Weber works on investigating defects in established and new semiconductor materials like silicon, silicon carbide and zinc oxide at Washington State University. He is expanding his horizon to teaching new generations of scientists.

Stacy Weinstein-Weiss joined the Jet Propulsion Laboratory in 1987 after graduating from MIT with a degree in Aeronautics and Astronautics Engineering.

She has worked in a variety of disciplines, including mission design / trajectory design, mission engineering, spacecraft system engineering, project system engineering, line management, mission operations management, project management, and payload management.

Stacy spent 4 years on the Cassini Mission Design team as a trajectory analyst and mission engineer. She was a co-founder of the Pluto Express mission that eventually launched as New Horizons. She worked on the Hayabusa mission with JAXA as a deputy project manager and system engineer for the NASA nanorover contribution. She was the Project Engineer for Mars Sample Return and also worked as the lead systems engineer for the sample capture, rendezvous, and Earth-return system.

Stacy is now a Deputy Payload Manager on Europa Clipper. She has recently been participating in interstellar mission concept activities.

Dr. Ken Wisian brings decades of military and government experience to bear on leading edge science and technology issues and applications. He has published dozens of papers and presented on topics from Artificial Intelligence (AI), to geophysics, military affairs, leadership and space exploration. Dr. Wisian served in the Air Force and Air National Guard for 33 years, retiring in 2015 at

the rank of Major General (Two-Star). General Wisian accumulated 3,800+ flying hours in all types of aircraft, mostly B-52s, C-130s, and Special Mission aircraft.

General Wisian holds a Ph.D. in geophysics from SMU, an M.S. in Strategic Studies from the US Army War College, an M.S. in Geology from Centenary, and a B.A. in Physics from the University of Texas at Austin.

Brigadier General Pete Worden, Executive Director, Breakthrough Initiatives, is the chairman for the Breakthrough Prize Foundation, where he runs the Breakthrough Initiatives. Previously, he has been Director of NASA's Ames Research Center at Moffett Field, California, has held several positions in the United States Air Force and was research professor of astronomy at the University of Arizona, Tucson. He is a recognized expert on space issues – both civil and military.

Worden has authored or co-authored more than 150 scientific papers in astrophysics, space sciences, and strategic studies. He served as a scientific co-investigator for two NASA space science missions, and received the NASA Outstanding Leadership Medal for the 1994 Clementine mission. He was named the 2009 Federal Laboratory Consortium Laboratory Director of the Year.

Michelle Yan is a Chinese medicine doctoral student at the National University of Natural Medicine. She is passionate about sharing how Chinese medicine works and in designing and co-fabricating spacesuits that incorporate design elements from a natural medicine perspective. To listen to her talk on Chinese medicine in Space please visit www.chinesemedicine.space

Major Brent Ziarnick is an Assistant Professor of Comparative Military Studies at the Air University's Air Command and Staff College and deputy lead for the Air University's Space Horizons Initiative. Maj Ziarnick is a command space operations officer with extensive experience in Global Positioning System (GPS) engineering, offensive space control, and theater space command and control.

In civilian life he was a launch operations engineer at Spaceport America, New Mexico where he developed the long-range plan for the world's first purpose-built inland commercial spaceport's vertical launch activity. He holds a doctorate in economic development from New Mexico State University, a master's degree in space systems engineering from the University of Colorado-Colorado Springs, a bachelor's degree in space operations from the United States Air Force Academy, and is a graduate of both the Air Command and Staff College and the School of Advanced Air and Space Studies.

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Lt. Gen. Steven L. Kwast	USAF, Air University, MAFB
Pauli Laine	University of Jyvaskyla, Finland
Dr. Geoffrey A. Landis	NASA
Bart D. Leahy	Heroic Technical Writing
Dr. Ronald Litchford	NASA Prin. Technologist for Propulsion
Yohon Lo	HAL5
Dr. Richard A. London	Lawrence Livermore Ntnl Laboratory
Douglas Loss	Tennessee Valley Interstellar Workshop
Ruby Loss	GUEST
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Michael Lynch, PE	Metro Atlanta Rapid Transit Authority
Bruce A Mackenzie	Mars Foundation
David Matetich	Student, University of Alabama
Prof. Gregory Matloff	New York City College of Technology
Dr. Paul McConnaughy	NASA MSFC Assoc. Director
Stephen McKamey	
James McMains	ExecuTime
Michael Mealling	Waypaver Foundation
Dr. Joseph Meany	Tennessee Valley Interstellar Workshop
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Marc G Millis	Tau Zero Foundation
Dr. Trevor Moeller	Univ. of Tennessee Space Institute
Sandy Montgomery	Tennessee Valley Interstellar Workshop
Laura Montgomery	Ground Based Space Matters, Law Offices
Monty Montgomery	MontTech, LLC
Laurence Van Cott Niven	Writer
Christine Oakley	Oakley's Gently Used Books
Dr. Gary Pajer	Princeton Satellite Systems
Dr. Kevin Parkin	Parkin Research, LLC.
Margaret Alden Patrick	Trajectory Eng, Jacobs Technology
Victor Ellicott Phelps	Nashville State Community College
Mark Phillips	NASA/MSFC
Robert Powell	Scientific Coalition for Ufology, Dir.
Dr. Tracie J. Prater	NASA/MSFC
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Cape Sandlin	
Kevin Schillo	University of Alabama, Huntsville
Dr. James Schwartz	Wichita State University
Dr. Andrew Siemion	Univ. of California, Berkeley
Mark Shafer	AT&T
Abigail Sherriff	Tennessee Valley Interstellar Workshop
Dr. Kelly C. Smith	Clemson University, Assoc. Prof.
Dr. Cameron Smith	Portland State University
Dr. Nick Solomey	Ad Astra Kansas Foundation
Prof. Olga Starinova	Samara University
Allen Steele	Writer
Rhonda Stevenson	Tau Zero Foundation
Carlin Stuart	MidSouthCon
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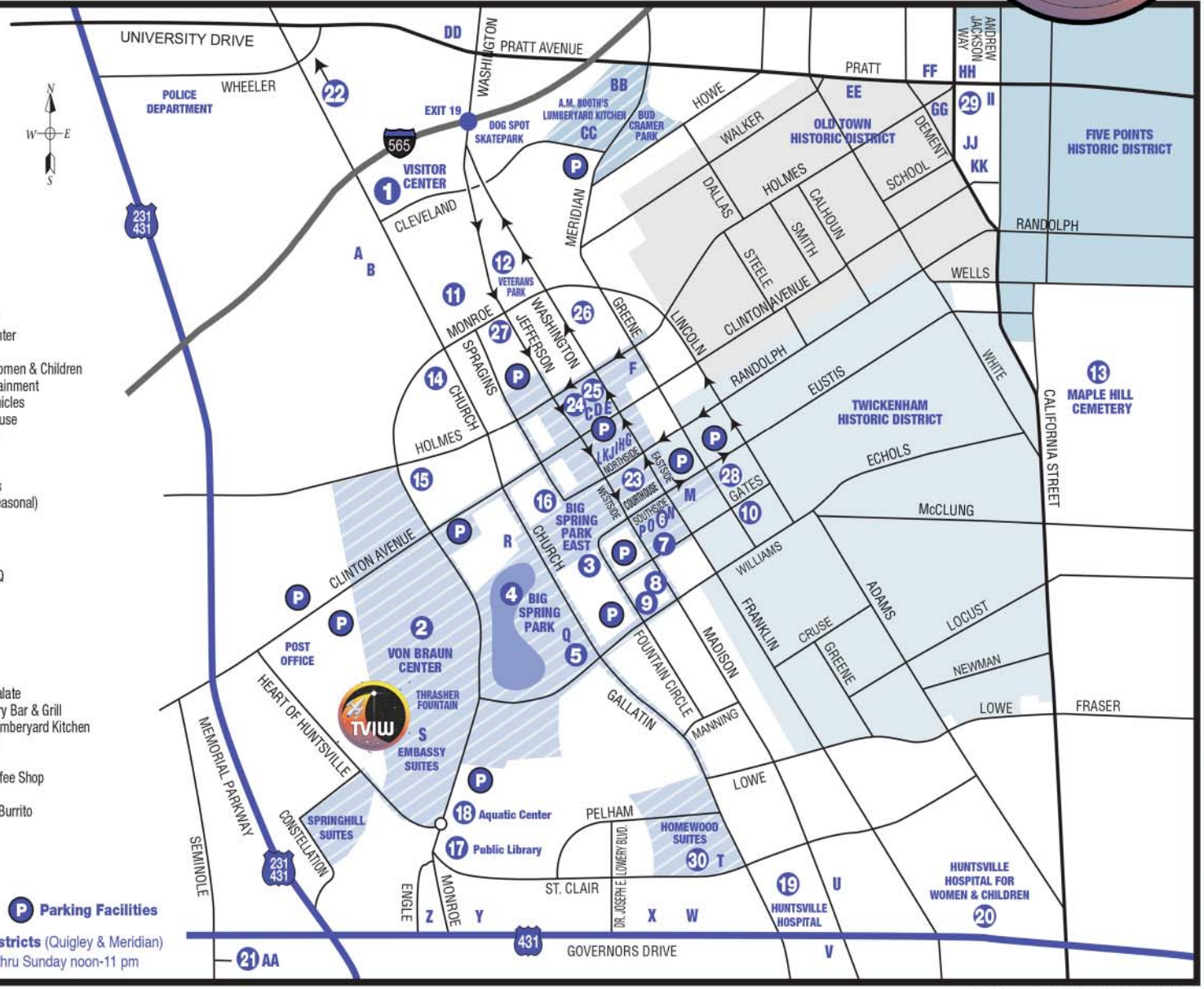
Grover Swartzlander	Rochester Institute of Technology
Angelle Tanner	Mississippi State University, Asst. Prof.
Carol W Tevepaugh	Water Oak Resources LLC
James A Tevepaugh	Water Oak Resources LLC
John Trieber	Trieber Productions
Connie Trieber	Trieber Productions
Dr. Slava G. Turyshev	NASA Jet Propulsion Laboratory
Dr. Mary A. Turzillo	Science Fiction Writer
Chris Wade	TVIW 2017 Featured Artist / Lowe Mill
Timothy Weaver	
Dr. Marc Herbert Weber	Washington State Univ, Professor
Dr. Peter Weiland	Radiance Technologies, Inc., SVP-CTO
Stacy Weinstein-Weiss	Jet Propulsion Laboratory
Toni Weisskopf	Baen Books
Kitteh-Dragon Wicklund	Paladin Publishing
Thomas G Wicklund	Seagate, Sr. Staff Engineer
Mike Willmoth	Pyramid Consulting
Maj. Gen. (ret) Ken Wisian	Galactic Ventures
Dr. Pete Worden	Breakthrough Prize Foundation Chairman
Michelle Yan	Chinese Medicine in Space
Major Brent Ziarnick	USAF Air Command and Staff College
Major Melissa L Ziarnick	US Air Force

TVIW 2017

Welcome to Huntsville, AL
and thank you for attending
the TVIW 2017 Event.

Downtown Huntsville



HUNTSVILLE

Huntsville/Madison County Convention & Visitors Bureau
500 Church Street NW • Huntsville, Alabama 35801
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Points of Interest

1 Visitor Center (Exit 19)
2 Von Braun Center
3 City Hall
4 Big Spring International Park
5 Huntsville Museum of Art
6 Harrison Brothers Hardware
7 Alabama Constitution Village
8 EarlyWorks Children's Museum
9 Bicentennial Park
10 Weeden House Museum
11 Historic Huntsville Depot
12 Huntsville Veterans Memorial Park
13 Maple Hill Cemetery
14 Chamber of Commerce
15 Greyhound Station
16 Huntsville Utilities
17 Huntsville Public Library
18 Jim Williams Aquatic Center
19 Huntsville Hospital
20 Huntsville Hospital for Women & Children
21 Lowe Mill ARTS & Entertainment
22 Department of Motor Vehicles
23 Madison County Courthouse
24 The Clinton Row Project
25 UG White Mercantile
26 Lewter Hardware
27 Railroad Station Antiques
28 Greene Street Market (seasonal)
29 Star Market
30 Publix Super Market

Restaurants

A Cyn Shea's
B Lee Ann's
C Humphrey's Bar & Grill
D The Bottle
E Pints & Pixels / Anaheim Chili
F Below the Radar
G Jimmy John's Gourmet Sandwiches
H Amendment XXI
I Big Oh's
J Sam & Greg's
K Downtown Diner
L A Cup of Everything
M Green Bus Brewing
N Commerce Kitchen
O Papou's
Voodoo Lounge (downstairs)
P Cotton Row
Q Pane e Vino at Huntsville Museum of Art
R Cozy Cow
S Ruth's Chris Steak House in Embassy Suites
T Cajun Steamer Bar & Grill
Chocolate Bar
Mei Wei Asian Bistro
Taco Mama
U Little Paul's BBQ
V Subway
W Pizza Hut
X McDonald's
Y Stanlieo's
Z Checkers
AA Happy Tummy
Chef Will The Palate
BB Furniture Factory Bar & Grill
CC A.M. Booth's Lumberyard Kitchen
DD Dallas Mill Deli
EE Waffle House
FF Olde Towne Coffee Shop
GG Tenders
HH Hardee's / Red Burrito
II 1892 East
JJ Ted's Bar-B-Q
KK Thai Garden

P Parking Facilities

Arts & Entertainment Districts (Quigley & Meridian)
Thursdays 5-11 pm / Friday thru Sunday noon-11 pm