

White Matter Chronicles



Publication of the Aerospace Physiology Society

“Lesion Free Since 1966!”

Edition 1: Summer 2015

High Altitude Surveillance: Notes From The President



Paul Gardetto, President – The Aerospace Physiology community is a talented group of scientists and educators. Our Partnership in Education is widely recognized throughout AsMA. We have a unique skill set that sets us apart and is also widely desired in industry and the public sector. I bet that most of you have been asked to provide a briefing to a school or other forum, and you captured your audience with fantastic science that few had heard about. As a next step in our partnership with education, I would like to focus on STEM. The Science, Technology, Engineering, and Math program is designed to instill an appreciation for math and science in our next generation. If you have had any experience with STEM, you may find that the emphasis is heavy on engineering – kids building robots and catapults, but getting little or no emphasis on life sciences. I spoke with one principle who said, I would love to do more life sciences but it seems harder to define. What a great opportunity for AsPS to continue our Partnership in Education. If I could wave a magic wand today, AsPS would have a database of willing Aerospace Physiologists, military or civilian, and a conduit to STEM program managers to request volunteers to teach a class in a local STEM program. If you share my dream, please email me or Wes Davis to help kick this initiative in high gear!

I can remember, many years ago as an Air Force Captain, the rivalry between Navy and Air Force Physiologists. What seemed a fun rivalry at the time caused confusion for our aviator customers. I had a wing commander ask me “Now let me get this straight, the Air Force will accept the physiologic training from allied Air Forces but not our own Navy?” “Yes sir that’s right,” I replied. We have come a long way since then and I believe that AsPS was – and continues to be – the catalyst for partnership between civilian, Navy and Air Force Aerospace Physiology. If not for AsPS I would not have developed the friendships with Navy and civilian physiologists that I enjoy today. As I write this editorial, my son, Ensign Joe Gardetto is a test subject at the Naval Aeromedical Research Lab while he awaits his training in Pensacola. Thanks to a friendship with Capt (S) “Ivan” Folga that developed through AsPS, my son is gaining knowledge and experience. As you mentor friends about the value AsPS brings to the AP community, please share with them your own personal story of how your network of friends and colleagues has grown from your membership in our society.

Welcome to the White Matter Chronicles!

Troy Faaborg, Past President – Before we get too far, I want to publicly thank Past President **Rich Folga** and current Treasurer/Membership Chair **Jaime Harvey** (a.k.a. “Sulci” and “Gyri”) for their unrelenting help coming up with ideas for the name of this publication. During months of intense brainstorming, more than 500 ideas were suggested (of which some 345 were purportedly submitted by CDR Folga), and some of them were actually good!

For the sake of historical record, take a look at some of the suggestions that we did not use:

- The Surly Bonds
- The Fartbag Gazette
- The pO2 Press
- White Matters
- The Purkingee Press
- On The Horizon
- AP Science
- The Rod of Asclepius
- The Zoom Bag Journal



“You can be my newsletter any time.”

So if you have complaints about the name “White Matter Chronicles,” consider what it could have been!

Congratulations!

The following AsPS members were honored with AsMA-level recognition at the 2015 Annual Scientific Meeting. Please be sure to congratulate them!

Brian Musselman

2015 AsMA Harry G. Mosely Award

Don White

2015 AsMA Walter and Sylvia Goldenrath Award

Troy Faaborg

2015 AsMA Fellow

Amanda Lippert

2015 AsMA Associate Fellow

Mari Metzler

2015 AsMA Associate Fellow

Do You Have Something to Share?

Please contact Troy Faaborg at tfaaborgs@gmail.com with inputs for the next edition of the **White Matter Chronicles**. We are always looking for news, events, announcements, and fun!

We would be glad to hear from you!

A Constituent Organization of the Aerospace Medical Association
Established 1966



Low Carbohydrate Nutrition for Aviators: Updated References from AsMA Orlando

Darrell Bonetti, Ph.D., RNZAF – Following on from my panel presentation in Orlando, I have been asked to share my reference list along with some additional reading and relevant websites related to low carbohydrate diets and how they may affect aircrew. A full manuscript based on the information I presented at AsMA will begin peer review for publication shortly.

As discussed in my AsMA presentation, while there appears to be strong evidence supporting the efficacy of carbohydrate restriction on metabolic and cardiovascular risk factors, the influence in aviation-specific environments warrants further investigation. Consequently, the RNZAF, Aviation Medicine Unit is planning a research study investigating the influence of carbohydrate restriction on measures of hypoxia tolerance, exercise and cognitive performance. Please do not hesitate to get in touch with me if you would like any additional information or would like to collaborate on this research project or other research projects linked to this theme.

Review Articles

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- Paoli, A et al., (2013). Beyond weight loss: a review of the therapeutic uses of very-low-carbohydrate (ketogenic) diets. *European journal of clinical nutrition*, 67(8), 789-796.
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- Volek, et al., (2014). Rethinking fat as a fuel for endurance exercise. *European journal of sport science*, (ahead-of-print), 1-8.

Cardiovascular & Metabolic Risk Factors

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Continued from Page 2, *Low Carbohydrate Nutrition for Aviators*

Websites:

1. *eatingacademy.com*: US Website, excellent information regarding the influence of carbohydrate restriction, and intermittent fasting on metabolic health, exercise and cognitive performance.
2. *Lecturepad.org*: US Website, excellent medical website which provides information on a variety of topics but most notably the assessment of metabolic and cardiovascular risk factors
3. *Profgrant.com*: New Zealand Website: Excellent information on how to adhere to a well formulated carbohydrate restricted diet.
4. *Dietdoctor.com*: Swedish Website: Excellent information on how to adhere to a well formulated carbohydrate restricted diet.

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Exercise and Cognitive Performance

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The 2015-2016 AsPS Board of Governors

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"We, the willing, led by the unknowing, are doing the impossible for the ungrateful. We have done so much for so long with so little, we are now capable of doing anything with nothing." -Unknown

Summer 2015

Turning Spatial Disorientation Training Right-Side UP in USAF Pilot Training

Andy Woodrow, Past President – Anyone who has slipped the surly bonds of Earth can attest that you can really get lost in the boundless sky. The unnerving sense of mismatch when confronted with cues from aircraft instruments, the body's 'internal gyros', and what was expected to be seen through the canopy is a condition that is known as Spatial Disorientation (SD), and until now the only way to fully recognize and recover from SD was to strap in and fly.

Beginning in May 2015, the United States Air Force began bringing advanced spatial disorientation training to pilot candidates across Undergraduate Flying

Training in Air Education and Training Command. The first of five devices was installed at Sheppard AFB TX, followed by Vance AFB OK, and Columbus AFB MS; Laughlin AFB TX and Joint Base San Antonio-Randolph will round out the program and position all pilot candidates and instructor pilots for formal SD events as part of their syllabus.

In an effort between AETC and the Air Force Life Cycle Management Center, a contract was signed with Environmental Tectonics Corporation to provide five GYRO IPT II (Integrated Physiological Trainer) spatial disorientation flight simulators to pilot training bases.

The GYRO IPT II will support the SD training requirements in pilot training syllabus by exposing each to typical vestibular and visual illusions found in aviation, enabling them to recognize, confirm, prevent, and recover from SD before they strap into an aircraft.

The award of this advanced system is the first advance to formal training in SD in decades and demonstrates the importance of SD training for the USAF; spatial disorientation is still a major contributor to aircraft mishaps. The GYRO IPT II will establish a solid foundation of recognition and recovery from illusions at the earliest instructional point of pilot preparation,

ultimately leading to increased safety as the pilot advances to other aircraft platforms.

ETC's GYRO IPT II cab resembles a T-6A cockpit and provides the student with a hands-on, realistic, full motion, SD flight training experience. While in control of a simulated flight, the pilot

can be exposed to a variety of selected disorienting illusions. Unlike simple disorientation demonstrators, a pilot in the GYRO IPT II has full closed loop control of the simulation before, during, and after the illusion. This capability creates a fully interactive flight training environment where the pilot must maintain control of the simulator and fly through the illusion to a successful resolution during training.



Want to see more? Check out AF news stories at:

<http://www.vance.af.mil/news/story.asp?id=123452473> and <http://www.sheppard.af.mil/news/story.asp?id=123447458>

Summer 2015

The Aerospace Physiology Society is proud to announce the 2015 winners of the Society's annual awards for excellence in operational aerospace physiology, aerospace physiology research, aerospace physiology leadership, and its Partnership in Education Award. The award recipients were announced at the Aerospace Medical Association's 86th Annual Scientific Meeting in Orlando, FL, during the AsPS luncheon. The Society would also like to acknowledge each of its award sponsors. Because of their generosity, each recipient is presented with a plaque and an honorarium. Additionally, the winner of the Fred A. Hitchcock Award is presented with a hardbound copy of "Barometric Pressure." This perpetual trophy is passed down to all Fred A. Hitchcock Award winners.

Paul Bert Award for Physiological Research

The award is presented annually for outstanding research contributions in the field of aerospace physiology. It is sponsored by Wyle. This year the Paul Bert Award for Physiological Research is awarded to Lt. Col. Brian Musseleman, USAF, BSC. Brian is a recognized expert in aero-space physiology, human performance, safety and accident investigation. He continuously invokes a positive impact through-out the AF and DoD. He currently serves as Air Mobility Command's Aerospace and Operational Physiologist Command Consultant. Over the past 15 years he has acquired vast experience with pressure suit and aircrew flight equipment operations; researched aeromedical solutions to numerous operational problems; investigated an F-22A fatal mishap as well as numerous physiological incidents; established the first ANG Human Factors Safety Division; implemented DoD HFACS across USAF investigations; and was key to the creation of the USAF Safety Center's Human Factors Division.



Fred A. Hitchcock Award for Excellence in Aerospace Physiology

The award is presented annually for excellence in either operational physiology or physiological research. This award is sponsored by International ATMO Inc. This year the Fred A. Hitchcock Award for excellence in Aerospace Physiology is awarded to Cmdr. Deborah White, USN, MSC, in recognition of her superior expertise as a human factors analyst and aerospace physiologist has provided unprecedented support to the aerospace physiology community. Her unique ability to identifying critical human factor issues related to adverse physiological episodes has been instrumental in directing critical research attention towards finding mitigating solutions that would ultimately improve aviation physiology readiness among both civilian and military aircrew. Her exceptional insight and unsurpassed professional knowledge directly contributed to some of the safest years in the history of aviation.



Wiley Post Award for Operational Physiology

The award is presented annually for exceptional service and achievements in operational physiology, including education and physiological support. It is sponsored by Gentex Corporation. This year the Wiley Post Award for Operational Physiology is awarded to Maj. Gabriel Gonzalez, USAF, BSC. Gabe serves as both the Operations Flight Commander and Assistant Director of Operations for the 9th Physiological Support Squadron at Beale Air Force Base, California. He provides high altitude operational physiological support and training for U-2 aviators engaged in worldwide intelligence, surveillance, and reconnaissance combat missions. He leads a team of 71 Airmen providing Full Pressure Suit (FPS) maintenance, support, and integration for the 9th Reconnaissance Wing and NASA as the Department of Defense's only FPS depot maintenance and supply center.



Partnership in Education Award

The award is presented annually to a teacher in a school district of the host city for the AsMA Annual Scientific Meeting. The winner is recognized as an individual who has brought a unique approach to teaching science in the classroom and has inspired his or her students to an interest in science. It is sponsored by the Aerospace Physiology Society.

This year the Partnership in Education Award was presented to Ms. Barbara Walters-Phillips. Barbara has been blending aviation and space into the curriculum for over 20 years. She currently serves her community as a 4th and 5th Grade Math and Science Coach at Cheney Elementary School in Orlando, FL. She teaches enrichment



classes where students study aviation using the Civil Air Patrol's Aerospace Connections in Aviation (ACE) program.

Her students have designed, constructed and launched hot air balloons; built and flown balsa gliders; as well as designed spacesuits for future astronauts. For several months, Barbara has taught a science camp each Saturday morning at the school where students participate in hands-on labs in both the life and physical sciences.

Barbara also travels to the Orlando Executive Airport where she works with the Orlando Youth Aviation Center teaching students about aviation related careers. Barbara has been introducing her students to the Experimental Aircraft Association's Young Eagles Program since it began. Through her efforts, many central Florida youth have had the free opportunity to go for their first airplane flight and sow the seeds of future aviation careers! Recently members of her chapter flew a record 102 students during one weekend event, contributing to the chapter record of over 10k students, and contributing to National EAA Young Eagles report of over 1.9 Million flights since the program began in 1992.

After their flight, the students come back very excited and want to know how they can learn more about aviation. The excitement from these future aviation professionals is what drove Barbara to write the curriculum for the Orlando Youth Aviation Center's *Introduction to Aviation* program. Barbara's efforts have forged new ties between students, teachers, and parents that foster cooperation between the school and the family that is so important to the growth and nurturing of her students.

For more AsPS award information, see
www.aspsociety.org/awards-and-recognition/

Or contact Maj. Dana "Addict" Thomas at
aviation_addict@yahoo.com

Upcoming Events

SAFE Orlando: November 2-4 2015

<http://www.safeassociation.com/index.cfm/page/symposium-overview>

AsMA 87th Annual Scientific Meeting;
Atlantic City, NJ—April 24-28, 2016

<http://www.asma.org/annual-meetings>

Fun With Retinas!

Everyone loves retinas, right? Well, now is your chance to show how much you know about them by answering these fun questions!

- Where is the macula?
- Where does the optic nerve insert?
- Where is the anatomical blind spot?
- Where is the physiological blind spot?
- Is this the left or right eye?
- And most importantly... **whose retina is this, anyway??**



Impact Opportunity:

The Junior Science and Humanities Symposium

The Junior Science and Humanities Symposium (JSHS) program is sponsored by the Department of Defense, and is designed to challenge and engage high school-aged students in science, technology, engineering, and mathematics (STEM). Individual students compete for scholarships and recognition by presenting the results of their original research efforts before a panel of judges and an audience of their peers.

JSHS is a collaborative effort with the research arm of the Department of Defense, and is administered in cooperation with nationwide colleges and universities. JSHS aims to prepare and support students to contribute as future scientists and engineers, conducting STEM research on behalf of, or directly for, the Department of Defense or Federal research laboratories.



Ready to get involved?

Get connected with your local regional JSHS competition or science fair as a judge, speaker, or other volunteer! <http://www.jshs.org/regions.html>

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