AMSRO
AEROSPACE MEDICINE
STUDENT AND RESIDENT ORGANIZATION

ORBITER NEWSLETTER

A Word from the AMSRO President

Anita Mantri

Dear AMSRO members,

Happy New Year 2016! Business at the November council meeting revolved mostly around the annual AsMA scientific meeting. As you make plans for attending in Atlantic City, I wanted to let you know about several new initiatives that were discussed:

1) Early Bird Discounted Meeting Registration ending February 1st

For the first time, AsMA is offering a discounted registration rate until February 1st. The rates are **$50 for students and $275 for residents**. This is a $50-75 discount from advanced and on-site registration. You must pay in full to take advantage of these rates.

2) Scholarship Applications due January 31st

Scholarship applications for the AsMA conference are due on January 31st. Scholarship information can be found at http://asma.org/about-asma/careers/scholarships.

3) Student and Resident Free Day on April 25th

AsMA President Dr. Kris Belland has been dedicated to increasing student and resident membership within the organization. He has declared **Monday, April 25th a one-day free registration for new students and residents**. If you or anyone you know is interested in learning more about AsMA and AMSRO but cannot commit to the full week of activities, this is a great opportunity.

4) Hotel Information

The Atlantic City meeting will be held at the Harrah's Resort from April 24th-28th. Hotel rates are set at **$97 per night** (a big decrease compared to past years). In addition, **complimentary self-parking and a $10 one-time fee for valet parking** will be available. We do still plan to organize an **AMSRO room-and-ride sharing** spreadsheet for those who are interested. Please keep an eye out for it in the coming months!

5) Housing Scam

AsMA was alerted that several national conferences have been affected by a recent housing scam. Members are contacted over the phone or by e-mail from a third party stating that they can receive discounted hotel rates to obtain personal and credit card information. One of the identified third parties is Exhibitors Housing Services. **Do not use any third parties to book your hotel stay for the annual meeting! Please go directly through the AsMA website for your hotel accommodations.**

6) Advice for Transportation

For members who will be flying for the AsMA meeting, it is recommended to **fly into Philadelphia and take a car to Atlantic City.** The drive is about 1 hour. Public transportation is available via the SEPTA and Atlantic City Rail Line but takes about 3 hours. We do still plan to organize an **AMSRO room-and-ride sharing** spreadsheet for those who are interested. Please keep an eye out for it in the coming months!

7) Passover Accommodations

This year's AsMA meeting does overlap with Passover. AsMA is working with a local synagogue to provide accommodations for Jewish members. AMSRO will be updated as details are determined.

8) Trumbo 5K on April 25th

The Trumbo 5K will be held again this year on Monday, April 25th before the opening ceremonies. Registration is available through the meeting registration website or on-site. All proceeds go towards the AsMA Foundation.

9) FAA William J. Hughes Technical Center Tour on April 29th

AsMA is trying to organize a tour of the Hughes Technical Center on Friday, April 29th. They will need names in advance for security clearance. If you are interested, keep an eye for an announcement from AsMA.

10) AMSRO Activities

Our meet-and-greet last year was so successful that we've decided to hold it again at this year's conference. We will be holding our **AMSRO meet-and-greet the evening of Monday, April 25th**. In addition, our **AMSRO general meeting** will be held in the late afternoon of **Tuesday, April 26th**. Further details will be provided in the months to come. The **RAM (Residents in Aerospace Medicine) Bowl** is scheduled for the afternoon of **Wednesday, April 27th.**

I'm absolutely looking forward to see you in Atlantic City! As always, please feel free to contact any of the AMSRO officers.

Sincerely,

Anita Mantri
AMSRO President

On the Road: Notes on Being a Clinical Nomad

Joseph S. Butterfield

I was recently approached to write an article for the Orbiter. I thought it would be interesting to readers to learn a little bit about how I went through my clinical rotations as an itinerant international medical student.

In the middle of nowhere, USA

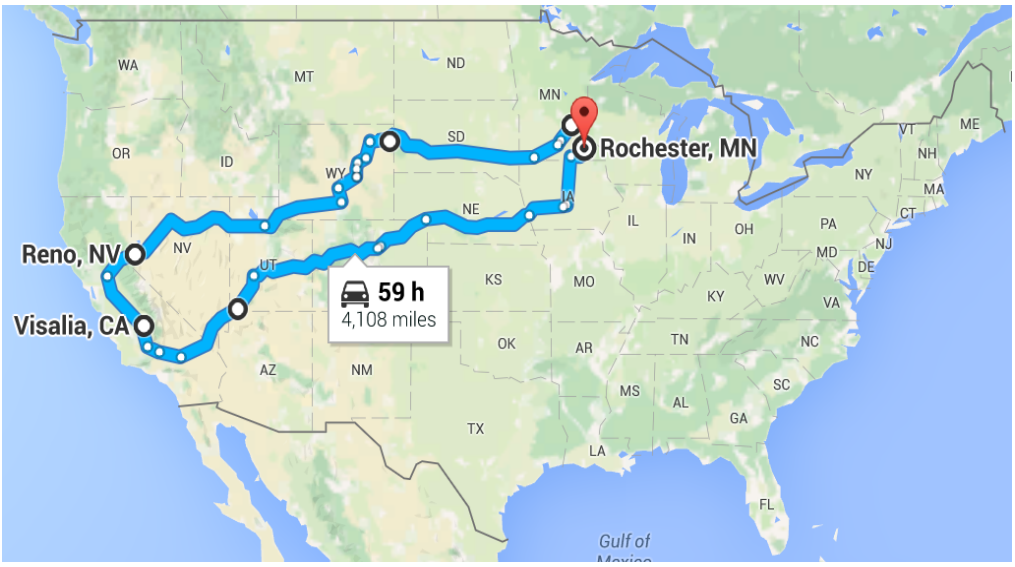
I graduated from an offshore medical school, one of the many that dot the Caribbean. Like most students who attend these schools, I had first applied to domestic medical schools but had not obtained a seat. Rather than spending years knocking and re-knocking on the doors of the American medical colleges, I preferred to move forward with my profession and chose the expeditious route of studying the basic sciences of medicine off-shore. It was altogether an interesting path to take, and the experience of living and working outside the borders of my own nation was invaluable. After completing USMLE Step 1, I began my clinical rotations in domestic hospitals back in the United States.

It is a straightforward process to study medicine this way, but it isn't always smooth. During clinical rotations I traveled over 17,000 miles by car to ten different hospitals in nine different states, coast-to-coast. This rather unusual approach to my clinical years was inadvertent - it hadn't been planned, but grew out of the challenges involved in scheduling my rotations.

Although my medical school was administratively based in New York City, we students didn't have a home hospital of our own. Instead, we were spread throughout a network of different hospitals that were formally affiliated with our medical school, and moved from one to another for different core rotations and electives. Most of these were located in New York City but there were a large number found elsewhere throughout the nation.

Traditionally, the clinical years encompass a full year of core rotations followed by a full year of electives. Although my school tried its best to book as many core rotations for us in a row, due to a backlog of students needing clinical training it was not usually possible to pursue our cores back-to-back. Sometimes there would be months between the end of one core rotation and the beginning of another. During these gaps, we students would try to save time by filling them with elective rotations, both in and out of our hospital network.

I was placed into a hospital in inner Brooklyn for my first two core rotations. On the first day of orientation we were asked, "who drove here to Brooklyn?" I raised my hand, thinking the question was



The ER Odyssey, courtesy of Google Maps. Yes, I drove 4,100 miles to do one elective ER rotation.

innocent. But from that moment forward I was a marked man! Since I was not originally from New York, I could not arguably stay put for future rotations while sending a native New Yorker out on the road. And since I was mobile (i.e. had a car), I was a prime pick to be sent to other locales. Little did I know that I was destined to embark on a near two-year journey across the USA.

But going through medical school like this was more amusing to me than irksome, and I was fortunate to explore much of the country that I hadn't visited before. The following account describes the first-half of the longest segment of my clinical travels, a 4,100 mile road trip from Minnesota, to California, and back again:

On the last day of my ER rotation in Minneapolis I was called and told not to come in. Due to a snowstorm the previous night the power had gone out in the administrative offices, rendering them cold and dark, which meant nobody was sticking around to give me the exit paperwork - a formality that could be handled by regular post. So I packed my bags and began the 2000 mile drive to my next ER rotation in Visalia, California, where one of our affiliated hospitals was located. It was Thursday afternoon when I departed and I had until the following Monday to get to there.

For the past year all my earthly possessions could fit into my car. I took care to pack what was necessary to be functional, since most of the time I ended up moving into apartments without furnishing (which were the least expensive). I had gotten it down to a system: A sleeping bag and air mattress could be wedged in the small spaces beside the seats and were enough for bedding. One suitcase of clothes went on the back seat. A folding plastic table stashed in the trunk served as a desk. A good office chair - my one luxury - also was jammed on the back seat. An entire library of books was stacked on the floor. Essential foodstuffs went on the passenger seat. There were four smaller bags put in the trunk: one each for office supplies, electronics, cookware, and miscellaneous effects. Somehow I stuffed a small printer, a medical kit, and my short

A winter sunset in South Dakota. Makes you cold just looking at it.

Close Encounters with Devil's Tower

white coat in with the mix. And a bike - required for exploring and getting around a new city - was strapped to the trunk. It was a full car when the packing was done, having everything I needed to be a self-contained, deployable medical student. I developed a checklist of non-essentials to buy at a local Goodwill in every city I went to - dish racks, lamps, cleaning supplies, etc., that were returned, given away, or simply abandoned when time came to move again.

Rather than fly from place-to-place, a car was a necessity to travel about a new city, to carry essential supplies, and was much less expensive overall. Medical school loans being rather limited, this was the most affordable way to do it.

I had planned to stop the first night in Rapid City, SD. The drive was smooth but long. The great plains really give credit to their name - they go on and on and on. There are a lot of plains out there, and after hours of driving much of it still looks the same. Notable tourist traps along the way included the birthplace of Laura Ingalls Wilder of Little House on the Prairie fame, and Wall Drug and its world famous 5-cent coffee.

After spending the night in Rapid City, the following day began by crossing into Wyoming. I had gotten an early start and was making good time when I saw the sign for the Devil's Tower Monument. It was one of those landmarks you notice in a schoolbook or a movie but that you never get around planning to actually see. Given that it was still early in the day I could afford the detour, and turned off onto an ice-crusted gravel road. I arrived to find the guardhouse empty and the park deserted - not the most popular place on a Friday winter morning. I got out and walked around the tower, crunching in the snow. All around the air was filled with a low moaning noise the wind made as it blew against rifts in the rocks. Except for a few curious deer I was completely alone. I'd never had an entire park to myself before and it was refreshing. Usually, these kinds of places are packed with tourists.

Pressing on, my destination that night was Salt Lake City. To get there took me down through the Thunder Basin National Grassland. The great plains have a sort of rolling quality to them, which confines the horizon fairly close to your line of sight. In the big sky country though, the land is basically flat, and the undulating nature of the plains disappears. The horizon recedes to the distance and creates a sense of vastness. It is a wild, desolate, remote part of the country.

Driving during the day like this was characteristically unusual for me. After spending many hours on the road, I've come to the conclusion that the most ideal time to drive is at night. Night is simply the best part of the day.

Somewhere in Thunder Basin National Grassland

The finest road conditions are as follows: late night, sparse traffic, dry pavement, clear skies, full moon, and a cool wind. Nothing beats that. Engage the cruise, play some tunes, sip your coffee and watch the shadowed landscape fly by, jeweled with lights. When the dawn broaches the horizon, stop at a hotel, sleep through the day, and repeat.

On the Shores of the Great Salt Lake

Why is night such a great time to drive? Well for starters, the most dangerous part of driving is not the risk of hitting a deer, or even bad road conditions, but the presence of other cars. The more cars that are around, the greater the chance of an accident. Driving in the presence other cars is an exercise in continuous collision avoidance because it requires constantly watching other cars, compensating for the behavior of other cars, or getting in the way of other cars. It is also much faster to drive at night. During the day, there are hundreds of people on the road, all driving at slightly different speeds. This requires constantly adjusting my own speed, engaging and re-engaging the cruise, and changing lanes dozens of times. Traffic jams and road construction are also much more common. Altogether, this brings down your overall rate of progress. At night, however, the country goes to bed and the road clears of cars, like plaque removed from an artery, which makes for smooth sailing. Additionally, the weather generally is more active during the daytime, which can lead to all sorts of delays due to snow, sleet, and rain, whereas at night the atmosphere cools and the weather becomes more quiescent. So I got in the habit of usually setting out in the early evening and driving through the night. I came to enjoy the serenity of being awake while the world slumbers, of passing across landscapes shrouded in the dark blues and blacks of the midnight hour, and the gentle solitude of the open road.

But this leg of the journey was a notable exception; it was my first drive out to the West and there were too many new things I wanted to see. The following day I rose early again, intent on fulfilling an old wish: to dip my finger in the Great Salt Lake and see if it was as salty as they say. It was!

Heading west out of Salt Lake City, there is an impressive stretch of salt flats. At first I thought it was snow, but getting a closer look at a rest stop confirmed that the white blanket stretching to the horizon was a immense bed of mineral salts. All along the way, an archipelago of dusty mountains arose from that ivory plain like islands from the sea.

The Bonneville Salt Flats

Goal! Now I can start my ER rotation!

My destination that night was Reno, NV. One other discovery I made driving out West is that gambling casinos sometimes offer very low hotel rates. The idea is that they get you to stay for cheap, with the hope that you'll subsequently lose a bunch on the blackjack table. I booked one of those places for my third night, thinking I'd stay away from the gaudy lure of the gambling den. But the coupon they gave me for a discounted meal required me to walk through the casino to use it, and it's not much of a stretch just to take a closer look at the games, to just betting a few bucks, to losing those few bucks. Yeah, they got me. Argh.

A fast drive the following morning took me over the Sierra Nevada mountains, down the California central valley, and into Visalia, a small city located just west of the Sequoia National Park. After four days and three nights on the road, I was ready to start my third and final ER rotation. But here the chapter must end, and perhaps the remainder of the tale told another time.

Joseph S. Butterfield is the Parliamentarian-Historian of AMSRO and resides in Boulder, CO.

Medical research in space: NASA astronaut Michael Hopkins and European Space Agency astronaut Luca Parmitano perform ultrasound eye imaging as part of the Fluid Shifts investigation during Expedition 37 on the International Space Station (NASA)

Spatial Disorientation Research as a PhD Student

Heather Panic

I've been intrigued by the problem of spatial disorientation ever since experiencing it myself while training for my private pilot's license. Although I had read about the various disorientation illusions in the theoretical course accompanying my flight training, I couldn't imagine ever falling for them. They all seemed implausible for a trained pilot. Unintentionally entering a downward spiral? Preposterous. That's what instruments are for, right?

My instructor, who to my lasting gratitude understood that personal experience is a better teacher than any lecture or book, set up a practical demonstration that I have never forgotten. We planned a cross-country flight at night across the desert south of Las Vegas. Once airborne, my instructor settled in for the long flight and soon nodded off. I wasn't concerned, because I was already cleared to fly solo and in any case there wasn't much for him to do for the next hour or so.

Figure 1. Multi-Axis Rotation System (MARS)

There wasn't much to do for me either, as I soon realized. The moon wasn't up, so there was nothing to see except for highway lights in the far distance. As the minutes ticked by, I became bored and complacent, staring into the distance and waiting for the time to pass. At some point, my instructor tapped me on my arm and pointed at the artificial horizon. To my dismay, I saw that I wasn't flying straight at all but was in a turning descent. My brain had interpreted the lights along the distant highway as a horizon and I had aligned the plane with them. My instructor had not been sleeping at all, but had been waiting for just this moment, and as I later learned, his instructor had given him the same demo years ago.

I was floored by how easily the brain could be tricked and I wanted to know more, so when I decided to enter a neuroscience Ph.D. program I already knew what my topic would be. There are very few university labs equipped for spatial disorientation research, so I was thrilled to be accepted at Brandeis University, which houses the Ashton Graybiel Spatial Orientation Lab. The Graybiel Lab is a multidisciplinary research group run by Prof. Lackner and Prof. DiZio, who both have many years of

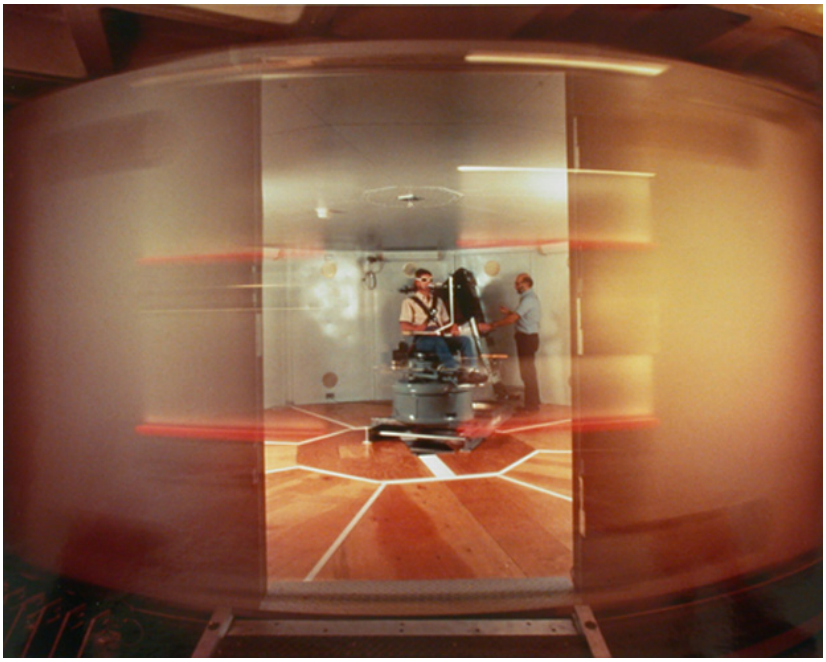


Figure 2. Rotating Room

experience conducting research for NASA and the military. Grad students and researchers in the lab come from multiple backgrounds: neuroscience, psychology, physics, and engineering.

I conduct most of my vestibular research using the Multi-Axis Rotation System or MARS (Figure 1), which is a computer-controlled chair that can rotate around two axes at the same time. The MARS can be equipped with an Oculus Rift virtual reality system for experiments that use visual cues as well as vestibular cues.

The centerpiece of the lab is the 22 foot diameter rotating room (Figure 2) which has been used in experiments on motion sickness, vestibular illusions, adaptations to altered force environments, and motor control. Other available equipment includes an optokinetic drum, a vertical linear oscillator track, and a small 6-degree-of-freedom motion platform. In short, any student interested in conducting spatial (dis)orientation research would find the equipment and expertise at the Graybiel Lab for nearly any experiment.

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