On March 24th, 2014, the National Training and Education Division of FEMA offered a training course on tornado awareness, lead by a Cornell alumnus Owen Shieh and Binghamton University alumnus Adam Helman. The course attracted a variety of participants in addition to a number of CCAMS members: emergency planners from Cornell, Ithaca College, and SUNY Cortland; local firemen; staff from NWS Binghamton, and even a wayward student from Penn State. The course was four hours and hosted on campus in Bradfield Hall - a first for the atmospheric science department. It was divided among five learning modules: an introduction and pre-test, the science of tornadoes, the weather forecast process, the tornado warning and...
Working at WENY, continued from page 1:

interviews. I had a very informal conversation with Joe Veres and the news director. After discussing my resume, they asked me to give a live performance in front of the green screen (live for them, not on air). I took a look through the prepared graphics and went for it.

A month later, I was back in beautiful Horseheads for training. I was taught about the weather software, Weather Central, the layout of the show, and my other responsibilities aside from broadcasting. I was so excited to have a job that I didn’t mind that my first day working would be Christmas Eve. This meant I was away from my family for the holidays, but it was all worth it. The first couple of days filling in have lead to a solid standing with WENY and ensured many future days of work.

Filling in during school days can be tough, but I love doing it so I can’t complain. A normal fill in routine will go something like this: sleep at 7pm, wake up at 2am, hit the road at 2:30am, arrive at the studio at 3:00am, forecast and produce graphics until the live show 6-7am, update the website and do any recordings for that day until 8am, get back to Ithaca by 8:45am, and get to class for my 9:05. Rinse and repeat until the weekend.

I’m currently still filling in for Good Morning Twin Tiers, but my last day may be coming up in April. No vacation time is scheduled through June, and by then I’m praying that I will have a full time job. No matter where I go, I will always remember my start at WENY.
The spring semester of 2014 has been off to a cold start here in Ithaca, but members who attended the American Meteorological Society’s Annual Conference in Atlanta, Georgia during the first week of February got a little respite. Four seniors and five juniors attended the conference in addition to many illustrious alumni. Students impressed conference goers with presentations and posters of their undergraduate and summer research ranging from topics of atmospheric dynamics to aerosols!

In addition, our department hosted a 4-hour Tornado Awareness workshop attended by emergency managers from the area and Atmospheric Science students alike. The workshop was given by the National Disaster Preparedness Training Center of the University of Hawaii and helped educate professionals about the threat of tornadoes in central New York.

Alumni Weekend is just on the horizon after a much-needed spring break. Our alumni chair Matt Greico has been busy planning the annual barbecue that will be held at a new location this year, the Cornell Recreation Connection Park. This is sure to be a nice change in scenery and all signs point to an enormously successful weekend!

Our Education and Outreach chair, Aaron Match, also has many upcoming events planned for the club including a demonstration on wind speed and direction for Expanding Your Horizons, a one day conference for middle school girls aimed at engaging woman in math and science. In addition, we’ll be hosting 25 faculty and their children for Bring Your Child to Work Day for another great opportunity to get kids interested in Meteorology. We all remember that moment when we became obsessed with weather, and hopefully we can make that happen for someone else!

We are proud to say that CCAMS will be presenting its first ever “Weather Models” calendar in the coming days featuring faculty and students from the department in a range of fantastical weather situations! We hope the calendar can act as a fundraising tool for CCAMS and let us seniors take a little bit of Bradfield with us as we prepare to depart.
I would recommend the course for freshmen and sophomores in the department to help solidify some basic forecasting principles for tornadoes. Juniors and seniors would benefit less due to meteorological knowledge already acquired through classes in the department, but having the FEMA certification listed on one’s resume is definitely a benefit to taking the course. All groups would benefit from the emergency planning modules, which generated a lively discussion among participants in the course. The questions and information asked about logistics during these high-risk situations that most instructors gloss over were thought-provoking and also showed that even the experts do not have all the answers, which was somewhat surprising given the diverse backgrounds in the room.

Overall, the course was a success, emphasizing the importance of tornado awareness among different community groups and also highlighting the diverse opportunities that Cornell students have post-graduation.
The Problem with the Polar Vortex

By Zack Labe '15

According to the Glossary of Meteorology from the American Meteorological Society, the definition of a polar vortex: “A planetary-scale mid- to high-latitude circumpolar cyclonic circulation, extending from the middle troposphere to the stratosphere… the vortex is strongest during the winter in the upper troposphere and stratosphere.” Essentially, it is a region of air contained by the polar jet stream that can extend all the way from the troposphere into the bottom of the mesosphere. It is essentially a permanent feature, but can show great day-to-day variability and amplitude. In addition, there is a southern hemisphere polar vortex that is often much stronger and characterized by colder temperatures in its column, which at times fall below 190K. However, a quick Google search on a polar vortex produces the following results:

‘Polar Vortex may mean miserable allergy season’
‘The Polar Vortex is Coming Back. Again.’
‘Polar vortex makes another move at Michigan next week’
‘What is the Polar Vortex and why is it doing this to us?’
‘Polar Vortex 2 Invasion’
‘Groundhog Day 2014 vs. the Super Bowl and the Polar Vortex’
‘I survived Polar Vortex 2014 Novelty Apocalypse – Men’s T Shirts’

We will stop there. As can be seen in the media’s anthropomorphic personifying of the polar vortex, there is clearly a problem. And that problem is science communication. My freshman year I attended a guest lecture by biology professor turned filmmaker and author, Randy Olson. He was debuting his newest book Don’t Be Such a Scientist with chapter titles such as: ‘Don’t Be So Cerebral’, Don’t Be So Unlikeable’, ‘Don’t Be Such a Poor Storyteller’, etc. In a slightly satirical, dear diary-type manner, Olson details that essentially we are doing everything wrong as scientists. He details methods in which scientists can better communicate through concepts such as telling everything through a story or try to understand that it is likely most people are not as interested in the topic as you may be.

The core of the polar vortex invasion hype is that indeed communication is often a forgotten, but serious problem in the scientific community. A balance between fact and simplification is needed to tell the ‘story’ and raise awareness for key meteorological problems in the twenty-first century from tornado warning forecasts all the way to bigger issues like climate change.

The polar vortex was never invading. The polar vortex is never going to be visibly over my head. And the polar vortex was certainly not out to get us. But is important that we take a look at the clear problems from this science-media Polar Vortex 2014 incident and find the core route of the issue.
How Cheyenne, The Bike, Got Her Name
By Aaron Match ’15

Fort Collins is such a bike-friendly city that their city maps mark the roads that do not have bike lanes. Every road is assumed to have a generous bike lane, unless outlined in a dotted red line. There are three such marked roads.

I've been a big fan of biking since I used to bike across two neighborhoods to get to Wildwood Lake when I was little. I've always wanted to complete a centurion -- a 100 mile bike ride. Last summer, I had a National Science Foundation Research Experience for Undergraduates at the Center for Multiscale Modeling of Atmospheric Sciences, in Fort Collins, CO. I researched the dynamics of the stratospheric polar vortex with Dr. Thomas Birner.

During week one of the internship, the internship coordinator showed me a bike that one of the interns had donated from last year. It was rickety-red with a wire, metal basket in front of the handlebars. Plus two flat tires and a dysfunctional derailleur. I am as big of a fan of sixth gear as the next guy, but after dozens of miles it can get a little bit passé.

During the fourth week of the internship, I commiserated over my bicycle struggles with Thomas. He sympathized, then shared that he had a spare bike that I could borrow. She was a sleek 1980s Trek road bike. I named her Cheyenne for two reasons: the first was her rich "cyan" paint.

The second:

Weekends in the foothills of Colorado are splendid. The Rockies burgeon just to the west, offering low-oxygen adventure and thrill. The Great Plains stretch to the east, so much grass.

Each weekend, the interns and I would complete a new endeavor -- hiking Grey Rock, white-water rafting the Poudre River, backpacking Conundrum Hot Springs. One weekend, the other interns wanted to go storm-chasing. Yes, I am an Atmospheric Science major, but no. I am not so much scared of tornadoes as scared of careening off some dirt road in a pancake-flat plain at 80 mph into a ditch. No thanks.

Since I ditched the convective caravan, it appeared that I might actually enjoy a quiet Saturday. Or I could test my solo biking legs. I have biked the Finger Lakes region with friends the past two Fall Breaks, with our longest day in the 65-mile range. I resolved to attempt that feat in the thin Colorado air.

I pulled up a map of Fort Collins-area with two rules in mind: 1) I would not bike downhill first. Just as one should never canoe downstream first, I don't like putting the harder part of an adventure second. 2) My route had to be a loop, because that doubles the sights. I outlined a 65-mile loop north to the Red Mountain

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Open Space, which is 8500 ft above sea level to Fort Collins' 5000.

I woke up on Saturday morning with the sun, and packed my sandwiches and water (six liters of it to match the day's 6% humidity). Since nobody brings six water bottles to his or her summer internship, I had to fashion a few from empty peanut butter and pasta sauce containers. I left my apartment at 5:30 am, with my street directions from Google Maps scrawled on the back of a hand-out from the prior day's presentation, which had been on recent developments in resolving hail signatures from Dual-Pol Radar.

Most of my route was on Colorado’s Route 287, a highway that skirts the mountains. Cars and trucks flew past at 75 mph. Intersections with the highway are sparse in the ranch land, and towns are that much sparser, so I had little concern about finding my turn onto Red Mountain Granite Canyon Rd. Right.

I overshoot by half an hour. When I reached the entrance to the Abbey of St. Walburga in the town of Virginia Dale, I knew that I had missed my turn. I retracted my path, finding the street name printed in giant white letters on a big brown sign.

Red Mountain Granite Canyon Rd is not paved; it's gravel and dirt. Road bikes have functionally no suspension and very narrow tires. So, bumping and sliding on the unforgiving gravel, I biked towards my next turn, a right. I bounced and bobbed past ranch after ranch, entrance shrines adorned with cow skulls. I stopped for lunch at a sign for the Colorado State University Research Foundation's Maxwell Ranch, no buildings in sight.

A right turn is a simple enough thing to desire, but after two hours, I had still not intersected a single public road. I was long past beginning to worry, but I had come this far. Finally, I saw an intersection in the distance. The public road going off to the right had a name that did not appear on my directions.

Furthermore, the road that I was on (and could not have possibly strayed from) also had a name -- Harriman Rd -- that was no longer Red Mountain Granite Canyon Rd.

Cellphone time, phone a friend in New York.
"Hey Emma, so I'm at the intersection of Harriman Rd and Chimney Rock Loop. How do I get to Terry Lake Rd?"
"I'll look up directions and call you back."
"Sweet, thanks."
Drink some water, wait three minutes.
"Hey, Aaron. Do you know you are really far away from Terry Lake Rd?"
"How far is really far?"
"You can't exactly get there from where you are. Do you even know where you are?"

An excellent cirrus circumhorizontal arc. Photo by Aaron Match.
Cheyenne, continued from page 7

"Well, I know how to get back home."

"Aaron, you're in Wyoming. You just reached a suburb of Cheyenne."

"Oh. Okay. Yeah. You know, I think I'm just gonna turn around now."

So I turned around. I violated Rule 2, and retraced the exact set of Wyoming and Colorado vistas that had ushered me there. Aside from almost running over a prairie rattlesnake, running out of water, and getting a flat tire that left me to walk the last four miles, the return trip went without a hitch.

Back at the apartment, I mapped out the route. My detour into Wyoming had added 26 miles, for a total of 91 miles. So close to a centurion. I called my mom to tell her I hadn't died, then went to bed.

As I lay in bed recounting the trip, I thought back to how I had initially missed my turn from the highway, ending up at the Abbey of St. Walburga. My brain jolted to action when I realized that I had forgotten to add those extra highway miles to the trip total. I leapt out of bed and ran to grab my computer. I found the Abbey of St. Walburga, seven miles past Red Mountain Granite Canyon Rd. Round trip, that added 14 miles, which brought my trip total distance to 105 miles. Subtract four miles of walking my bike with its busted back tire, and that's 101 miles of biking. A centurion!

And that's how Cheyenne, the bike, got her name.
Volunteering at the AMS Annual Meeting

By Gaige Kerr ’15

The visit of alumni Mark (’82) and Melissa (’83) Fernau during last April’s annual Alumni Weekend exposed me to the opportunity of volunteering at the Annual Meeting of the American Meteorological Society (AMS) as a student assistant. The promise of waived conference fees, lodging, and a food stipend appealed to me, and I went ahead with the application process last fall. The application was very straightforward: basic demographic information and a letter of recommendation from one’s academic advisor.

I received news in early winter that I had been accepted as a student assistant, and I reported to the speaker ready room at the conference centre during the first two nights of the student conference for training. I worked extensively with the Fernaus and other staff members from 45 Beacon Street to assist speakers and session chairs during symposiums and lectures. The work, which revolved around audio/visual equipment, was easy and gratifying and mainly consisted of helping with the conifex (audio recording) system, timers, and PowerPoint presentations. I was assigned sessions every day of the conference. The bulk of the sessions that I worked in focused on public policy regarding various facets of meteorology and climatology: topics that I may not have been exposed to if I hadn’t been a student assistant. Some of the more interesting presentations I heard involved the socioeconomic impacts of modifying the current hurricane warning system to better encourage evacuation and precautionary decisions. Another interesting talk was given on Hurricane Sandy and climate change; while the talk was interesting in and of itself, the proceeding question and answer period turned into an argument between parties over the veracity of the research.

My student assistantship didn’t detract from my conference-going experience in any regard. I was still able to attend many talks and sessions on topics that interested me, as well as enjoy local historical attractions that Atlanta had to offer. I formed friendships with other students who served as student assistants and fostered one-on-one connections with presenters. For those students who may consider attending a future Meeting of the AMS, I would strongly encourage you to consider serving as a student assistant; the professional, social, and financial benefits will not disappoint.
Life After CCAMS
By Aaron Perry ’11

Part I

A few years ago as a junior I wrote about my time abroad in Australia and all the amazing things you can do studying abroad. It turns out that my wanderlust was never really satisfied from that semester abroad. As a testament to that, I’m writing this in Frankfurt, Germany a few hours away from my life in Budapest. It wasn’t a direct route to get to where I am, but around this time two years ago I had to make a choice about which path I wanted to take and, to paraphrase Robert Frost, I took the path less traveled by, and it made all the difference.

I did not apply to a Masters or PhD program before I graduated, I wasn’t quite ready, I didn’t know what I wanted to do. I applied for jobs, never quite finding an exact fit. Eventually I found myself back at Cornell as a research assistant, and I loved it. It gave me the experience in research I never aggressively pursued as an undergrad. This job, however, was temporary, and as much as I enjoyed it there was still something missing, something I wanted to find. I needed perspective to really find what I wanted to do.

When I did apply to graduate programs it was not my intention to move abroad. I knew I was not ready for a PhD, I still did not know what I wanted to do. So, I looked at environmental science and policy programs. They were broad programs covering a wide range of topics and issues. I hoped that these would give me the perspective I was looking for. I applied to half a dozen program across the US and abroad, and I was fortunate that come acceptance season I had no shortage of options.

I weighed the all the options, the scholarships I received, the reputation of the programs, the cost the job opportunities. I toured all the schools I could. There were a couple of front runners with great reputations and good scholarships, and one that I never heard of, that seemed too good to be true. This one wasn’t the cheapest of my options, nor did it have the best curriculum, I had never heard of the university, I hadn’t seen any program like it, but I had to go.

The program I choose was MESPOM, and it has taken me on an even greater adventure than I could have dreamed. MESPOM stands for Masters of Environmental Science, Policy, and Management. It is a traveling international, interdisciplinary program, part of a group of degree programs sponsored by the European Commission, called Erasmus Mundus (now Erasmus+).

Over the last two years I have lived or worked in Hungary, Greece, Sweden, and Denmark, and studied with students from over 20 different countries. I have also had the opportunity to travel to another 10 during my time in Europe. I have found living and working continued on page 11.
Life After CCAMS, continued from page 10:
in foreign countries to be challenging, but also extremely rewarding. I have undoubtedly grown significantly both personally and professionally in this program.

MESPOM is an exciting, challenging, and at times frustrating program. You need to go in with the right mindset, and more importantly the right expectations. This is not a science program. You will not come out a chemist or biologist. You will not become an expert or specialist in any one area. To be blunt, I found it very difficult to keep my math, programming, and statistic skills sharp, and very frustrating at the lack of new hard skills taught in the program. To compensate I studied some programming languages online, and deliberately choose a thesis topic that I could do quantitative analysis with.

What this program does give you is a little glimpse into everything: ecology, pollution, law, politics, business, sociology, finance, philosophy, economics, and more. The purpose is to equip you with this knowledge and help you to understand how the pieces fit together so that you can better understand complex environmental problems and come up with solutions.

Today, almost halfway through my final semester, I still don’t know what I want to do. However, MESPOM has given me a wider perspective than I could have possibly have asked for, and left me in a place I couldn’t have imagined two years ago.

If my story appeals to you, if you’re not sure about what you want to do, or if you’re just looking for more post-graduation options keep reading for more practical information on ways to travel and live abroad after graduation. I’ll tell you about the path I took, and some of the other options I’ve come across during my time abroad.

Part II

There are no doubt dozens or hundreds of different options after graduation, the options I’m going to lay out here focus on getting you abroad for an extended period of time. I’ll go through permanent jobs, graduate school, and temporary jobs. This is not an exhaustive guide, just a few of the options I’ve come across.

Permanent Jobs

I’ll be brutally honest here, if you’re looking to work full time abroad right after graduation you’re in for a long and potentially fruitless journey. Unless you have citizenship in the country you want to work in, getting an entry level position, even at US companies operating abroad, will be almost impossible. The exception to this is if you have exceptional language skills (Think near fluent in 2 or 3 languages).

There may be exceptions to this rule, but those may be hard to find. For example, some countries have, or predict that they will have, a shortage of workers in certain skilled industries. People possessing the right skill sets can apply for a visa to find a job without employer sponsorship, although in most cases they are looking for people with work experience. I believe Australia has a program like this, although meteorology was removed from the list prior to 2010. If you really want to live abroad it might be easier to also have a degree from the country you want to live in (see below).

Since obtaining a permanent job abroad is so difficult another option might be to find a job in the US that will send you abroad. Many larger companies offer rotations or graduate training programs that will send you to different parts of the company all over the world to be placed. Most of these companies are not looking specifically for atmospheric scientists, some are looking

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Life After CCAMS, continued from page 11:

for science backgrounds. Be warned the deadline for applying to these jobs is early, around September/October for some.

**Graduate School**

For graduate school abroad I see two options, an atmospheric science program or an interdisciplinary program. I think an atmospheric science program abroad would be a good option if you want to want to live abroad for an extended period of time. If might be easier to get a job in a country if you are a graduate from a university there, but not always.

An interdisciplinary program for graduate school is a good option if you’re still not sure what you want to do, and you want to travel a bit. I recommend looking at the European Commission’s Erasmus+ programs. These are programs that travel to multiple institutions around Europe and may allow you to complete a research project anywhere in the world. My classmates are currently in Germany, Kenya, South Africa, Fiji, and Antarctica just to name a few. You get one degree issued jointly by the main partner universities in the program. Many of these programs are also accredited in the US.

**Temporary Jobs**

These options are more for those who might want to take a gap year just for fun between Cornell and work or grad school, although you can definitely put the effort in and make these months or year abroad more of a resume builder. I’m sure you heard of a lot of these options like the Peace Corps, or teaching English abroad. There are loads of programs like these, and some of them are very competitive. However, there are other options you might not expect.

The UK, Ireland, Australia, and New Zealand offer what is called a working holiday visa. It is a visa that allows you to stay in those countries for usually around 6 months to a year, and get a small job or internship to help support you while you’re there. There are some limitations to the programs, and the visas are not cheap, but if you’re an outgoing person who really wants to see the world, and is willing to work any job, this might be for you.

I hope you both enjoyed the lengthy read, and found something useful in it. I think traveling and living abroad can be fun and rewarding experience for everyone. Many of you already have an idea of what you want to do with your career, others I’m sure are like me and still not quite sure. Either way I hope some of you will consider these options, sometimes the journey is more interesting than the destination.
WEATHER MODELS
2015 Calendar
The Field Guide to CCAMS Leaders

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