When I first piled into the car with Sam, Si’Ana, and Elizabeth to head off to the Sautee Mount-
tain Retreat, I had no idea what to expect for
the weekend that awaited us. Though we had bumped
into each other several times either during the various
orientation events, this would be the first time
that we would actually spend an extended period
of time together as a group. As we trailed down
the highway, some of us awkwardly making con-
versation, munching on cookies leftover from the
Jones Program in Ethics, or curling up against the
window to take a nap, I soon realized that these
would be the very people with whom I would be
spending at least the next five years as part of the
Emory University BCDB program. So many differ-
ent thoughts and emotions coursed through my
mind during that first car ride, but I was excited to be a part
of this next great adventure.

The second-years came out to greet us as soon
as we began unpacking our bags. I have to tell you, they
could not have picked a better spot to host a retreat. All of
the gorgeous trees, the red clay hills, and the mountains
off in the distance were breathtaking, and I kept imagin-
ing how beautiful this place must be during the Fall when
all the leaves begin changing colors. We were all starv-
ing after the long car ride, and upon smelling the amazing food that they had cooking in the
kitchen for us, we practically ran upstairs after we claimed dibs on beds and dropped off our
suitcases. As we scarfed down Sabrina’s amazing
chips, guacamole, and queso while waiting for the fajitas to be ready, the second-years im-
mediately made us feel right at home. Allaying some of our fears about graduate school and
telling us some of their many memories from when they were in our shoes as first-years, they
reminded us that even though the road ahead of us will be
difficult, BCDB is first and foremost a family, and that
we can all rely on each other as we grow in our respective fields.

~continued on page 3
T here seem to be lots of stories that feature science in entertainment, but rarely does the portrayal of science feel accurate. However, one movie released this year, “The Martian”, was a breath of fresh air in that it had a much more realistic basis in real science that the more typical film. Personally, I think that it is far more badass that Matt Damon’s character grew potatoes on Mars as opposed to anything that can be done with a lightsaber.

There’s good reason for the scientific realism in “The Martian”. The film is based on a novel that was written by Andy Weir, who at the time was making a living as a software engineer. He had come up with the idea of a scientifically accurate story about an astronaut marooned on Mars but he had difficulty in getting any publishers interested in his pitch. So instead, Weir opted to self-publish chapters of the novel as a serial on his own blog. He had done a lot of his own research in order to get the science “right” but more critical readers with diverse expertise gave him feedback as well. By incorporating reader feedback into the story, Weir was able to get the scientific foundations as realistic as possible.

So is this an example of a well edited novel? Was it crowdsourced? Or is it an example of peer review? In some respects these are different terms that reflect the same process: feedback. And the end result of high quality feedback is often a better paper, grant application or even novel. What we call feedback has different connotations though, and usually reflects the stakes of following or not following it. Mentioning anonymous peer review seems to be a particularly potent way to cause anxiety. Not knowing who is critiquing your work is frustrating and trying to figure out who they can degenerate into a parlor game that is tough to win. Even when given a study section roster to choose from.

It is a rare individual who can receive any sort of critique and not feel some twinge of pain. A rigorous critique can be especially tough to accept, and any review that leads to a rejected manuscript or grant application will challenge anyone’s patience.

Of course, part of how a critique is received will depend on how it is presented. This is a major reason why we spend so much effort in the Beginning Seminar class on how to productively critique presentations. It’s easy to identify things that are bad or good, but constructive criticism is far more valuable. The “tough but fair” critique is the best one to provide and, believe it or not, to receive. Particularly when balanced with comments underscoring strengths as well as weaknesses.

A game we often play when putting together manuscripts is trying to guess “what experiments the reviewers will ask for?”. Some experts at this invoke the reviewers when nobody really wants to do a particular experiment. Of course the more straightforward approach is to strive to put a rigorous, well controlled dataset together. In fact, the next application cycle, the NIH is instituting new standards for peer review of scientific approaches for rigor and reproducibility which underscores the general importance of being thorough and careful in research.

In general, trying to anticipate what reviewers will ask for is not easy and actually defeats the purpose of having an outside eye evaluate your work. It is much better to ask a friend for feedback instead. And second guessing the review process is often counter-productive. More than once I have found that the key experiment that I am certain the reviewer will want is not even mentioned. However, they come up with another angle that we hadn’t even considered. So it is worth it to ask yourself and your co-authors what the rationale for any experiment is. If it improves the story and rigor of the dataset, then it clearly needs to be done.

But if you are curious about satisfying a reviewer’s comment, there’s nothing quite like submitting your manuscript and getting the actual critique to address. With luck it will be a tough but fair and addressable critique. With that concrete end goal and maybe just a few winces the next version will be a better paper in the end.

DIRECTOR’S CORNER WITH MIKE KOVAL
After that night, the rest of the retreat passed like a whirlwind with all of the activities that the second-years had planned. I remember the funny ice-breakers and the great “3-minute thesis” talks that opened up the day. This gave us a great opportunity to get to know many of the upperclassmen and faculty and all of the work they do as part of the BCDB program. Through my interactions with them, I began to appreciate not only the amazing research that they conducted, but I also witnessed the sense of community and friendship that united all of them. Though they studied fields ranging from tight junctions to epigenetic reprogramming of primordial cells, all of them united together as researchers as part of their common desire to better understand their world. I also remember the many adventures (and misadventures) we had as we carpooled up to Raven Cliff Falls. We had so many great laughs as we continued to get lost along the car ride and as Renhao suggested that we stop by Helen, Georgia to try out their “famous” pickled peaches. I will never forget how beautiful the hike was to the falls, nor will I forget the fear yet excitement that I felt climbing with Amanda and Ed up along the rocks to swim in the freezing water. The memories of all of the great food, the fun games, and the great memories I shared with the upperclassmen, teachers, and my cohort will always remain with me.

As we packed back into the car to make the journey home, I realized that something had changed between my five classmates and me. Though each of us will have our own memories of that retreat, I believe that we will always remember this weekend as the chance we had to bond together as friends. Even though we have no idea what lays in store for us, I know that we are ready for the challenge and that we will learn to work together. We are all so grateful to share in this memory of the 2015 BCDB Retreat, and I look forward to the day when my class and I may pass on the torch to the next class of first years.

~Rachel Turn

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MEET YOUR EXECUTIVE COMMITTEE

Graeme Conn: Director of Graduate Studies

Christine Dunham: Student Progress

Xiadong Cheng: Rotations

Paul Doetsch: Communications

Guy Benian: Curriculum

Rick Kahn: Recruiter

Shoichiro Ono: Exams

James Zheng: Membership

Julia Omotade and Josh Francis: Student Representatives

Anita Corbett and Larry Boise: Training Grant
Spotlight on BCDB’s first year class:
“If you were a post-translational protein modification, which one would you be?”

“I’m a pretty down-to-earth and adventurous person, so if I were a PTM I’d be the stabilizing/localizing modification sumoylation.”
~Si’Ana Coggins

“If I were a post translational modification I’d be a hydroxyl group, because everything is better with alcohol.”
~Elizabeth Minten

“I would be succinylation which changes lysine’s charge from a +1 to -1 because I hate all things basic.”
~Tyler Moser-Katz

“My PTM would be glycosylation, because I have a really bad sweet tooth.”
~Rachel Turn

“I would have to be methylation because methylation would be nothing without SAM.”
~Samantha Schwartz

“If I were a PTM, I would be bromination because I am rare and unique.”
~Ian Jacobs

Where did they end up?

Emily Bartle: Mattheyses Lab
I’m the first graduate student to join the brand new lab of Alexa Mattheyses. We develop and apply novel super resolution microscopy techniques to test biological questions about the desmosome, an epithelial cell-cell junction. Using these techniques allows us to bridge the resolution gap between traditional microscopy and protein structural techniques to probe the order and organization of proteins within a macromolecular complex.

Kelsey Maher: Deal Lab
I joined the lab of Roger Deal, in the Biology Department. The goal of our lab is to use the model plant Arabidopsis thaliana to identify novel epigenetic mechanisms, especially those which impact development. My project focuses on the characterization of enhancer elements in A. thaliana, to see if the chromatin features characteristic to these regulatory sequences are completely conserved among animals and plants, or if novel modifications may exist.

Regan Esposito: Ortlund Lab
My project in the Ortlund lab focuses on understanding the role of the ubiquitously expressed lncRNA Gas5 in regulating apoptosis and proliferation. We use biochemical and structural biology approaches to discover and characterize the mechanism behind Gas5 cellular control.

Amanda Engstrom: Katz Lab
The Katz lab utilizes multiple model systems to investigate the role of chromatin modifying enzymes in cell fate specification and maintenance. In my research I am investigating the role of the histone modifying protein LSD1 in tau mediated neurodegeneration.

Sabrina Lynn: Koval Lab
I joined the Koval lab, which specializes in lung epithelial cell biology and tight junction protein complexes that help maintain the epithelial barrier. My research project focuses on the effect of HIV on the lung barrier, specifically whether changes in the tight junction composition in lung epithelial cells predispose HIV-positive individuals to more severe sepsis and bacterial pneumonia.

Ed Quach: Li Lab
The lab of Renhao Li focuses on platelet membrane receptors and their role in cardiovascular and/or immune-related diseases. We are a multidisciplinary lab utilizing a broad base of approaches including molecular biology, traditional biochemistry, cell biology, structural biology, and imaging to answer questions about platelet function. One of my projects in the lab involves developing a novel prognostic assay for the most common bleeding disorder worldwide, immune thrombocytopenia.
The Mattheyses laboratory is interested in how cells interact with each other and their environment, and how the spatial-temporal dynamics and regulation of this communication directly impacts cellular homeostasis and function. We develop and apply innovative fluorescence microscopy techniques to elucidate the dynamics, forces, and organization of proteins within macromolecular assemblies. Our three main areas of interest are: the organization and regulation of desmosomes, mechano-transduction and molecular forces in cell adhesion, and protein dynamics in vesicle formation and endocytosis. Characteristics of proteins in the cellular environment – localization dynamics, higher-order organization and assembly, and mechanical tension – can alter function, yet the number of tools that can dissect the native physical environment of proteins lags behind that of biochemical analyses. Our research combines sophisticated imaging including super-resolution fluorescence microscopy (SIM and dSTORM), total internal reflection fluorescence (TIRF), fluorescence polarization, and microscopy technique development with primary and continuous cell culture models, molecular biology, theoretical modeling, and image analysis. Our goal is to gain a mechanistic understanding of the dynamics and function of macromolecular complexes in cellular communication and providing insight into the cellular basis for human health and disease.

I joined Emory in September 2014 as an Assistant Professor in the Department of Pediatrics and a member of the Aflac Cancer and Blood Disorders Center. I am interested in cell adhesion in vascular cells with a particular research focus on integrin signaling in endothelial cells and platelets. In my spare time I enjoy cheering my hometown Minnesota Vikings and/or jeering the Green Bay Packers.

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Welcome to BCDB:
New faculty profiles

The Mattheyses laboratory is interested in how cells interact with each other and their environment, and how the spatial-temporal dynamics and regulation of this communication directly impacts cellular homeostasis and function. We develop and apply innovative fluorescence microscopy techniques to elucidate the dynamics, forces, and organization of proteins within macromolecular assemblies. Our three main areas of interest are: the organization and regulation of desmosomes, mechano-transduction and molecular forces in cell adhesion, and protein dynamics in vesicle formation and endocytosis. Characteristics of proteins in the cellular environment – localization dynamics, higher-order organization and assembly, and mechanical tension – can alter function, yet the number of tools that can dissect the native physical environment of proteins lags behind that of biochemical analyses. Our research combines sophisticated imaging including super-resolution fluorescence microscopy (SIM and dSTORM), total internal reflection fluorescence (TIRF), fluorescence polarization, and microscopy technique development with primary and continuous cell culture models, molecular biology, theoretical modeling, and image analysis. Our goal is to gain a mechanistic understanding of the dynamics and function of macromolecular complexes in cellular communication and providing insight into the cellular basis for human health and disease.

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Refreshed the Methods (Class)

The Monday methods seminar was initiated by Rick Kahn several years ago as a way to familiarize first and second year students with new techniques presented in Wednesday seminar. Initially, the students presenting in the upcoming Wednesday seminar would give an intro primer during methods to prepare newer students and focus on the basics that are often missed during advanced seminar. Since that time, methods has changed to accommodate different classes and our busy schedules. The past year focused on exciting new techniques that were generally more advanced than the methods covered in foundations.

This year methods has a mission to return to the basics. The seminar meets on the first Monday of most modules and discusses a basic method that is fundamental to the current subject in the foundations class. This style provides a resource for the first years to have better critical analysis of the papers they will read throughout the upcoming module. During the second semester, the seminar will be on the second Monday of each module. The focus will shift towards synthesizing several techniques for method design and problem solving on scientific questions that are relevant to the current foundations topic.

In addition to changes in the Monday methods class, this year the BCDB Training Grant students have looked to enhance Journal Club. Since Journal Club’s beginning it has exposed students and faculty to a wide variety of both classical and cutting edge discoveries. Originally Journal Club was run by the Cell Biology department until Barry Shur, the Cell Biology chair at that time, turned control over to the students in the BCDB Training Grant.

Journal Club has evolved throughout the years, and this year it is making yet another step in a new direction. Journal Clubs are run monthly, and alternate between traditional Journal Clubs run by a student/faculty pair, and a new component “Debating the Controversy”. Debating the Controversy is a chance for all students and faculty to get involved in some of the hottest scientific controversies that are currently being debated. Two students, guided by faculty familiar with the controversy will present one paper of support for each side. Then the students and faculty get the opportunity to debate the opposing sides themselves. This addition allows for an exciting new opportunity for students to debate with faculty on issues on the forefront of science.

Welcome to BCDB:
New faculty profiles

~Alexa Mattheyses

~Brian Petrich
It is probably normal for a picture of Frankenstein to pop into your mind when you hear “donate your body to science.” This phrase elicits a myriad of unpalatable images in the minds of many. While donating human tissues and organs for medical research may not be the most appealing conversation starter, the truth is that science benefits from post-humous donations in a very real and important way. The donation of human tissue for scientific research can be a provocative topic. Because of the sensitive nature of this topic, I believe it is one of many topics where we as scientists bear the burden of factual communication to the general public. Knowing the inherent value of such materials to our labs, departments, and fields of research as well as explaining this value to others is something that we shouldn’t shy away from.

Donations to biomedical research come from a variety of sources—adult donors who give consent before they die, parents who choose to donate children's bodies, or donations of fetal tissue. Donations have one commonality: the materials are precious and limited in quantity. The important thing to remember, however, is that not all tissues and organs are created equally. Each type of tissue from donors of different ages has different prospects as far as biomedical research.

A recent podcast from NPR's Radiolab covered the heartwarming story and highlighted the prolific impact of one couple's donation. Ross and Sarah Gray gave birth to identical twin boys, one of which suffered from anencephaly and died five days after birth. Thomas Gray's eyes, liver tissue, and spinal cord fluid were donated to Schepens Eye Research Institute in Boston, Cytonet LLC in Durham, and Duke Center for Human Genetics in Durham respectively. When Thomas's parents decided to track the impact of their son's donation two years later they said they “felt their grief change into pride.” In Boston, the researchers who accepted the extremely rare and valuable sample of infant eyes showed pictures of Thomas's corneal cells to the Grays and explained to them that their son's donation has resulted in a highly cited study. The work was an integral step in the fight to cure infant blindness. The Grays also visited the Duke laboratory in Durham to find out what became of their son's spinal cord blood. Thomas's brother had also donated a sample from his spinal cord. As researchers, we can appreciate the prolific rarity of this study: samples from genetically identical twins, where one infant has a lethal disease. There is no better human control study. Duke researchers identified over 1,000 epigenetic differences in the blood of Thomas and his healthy brother. Interestingly, one of the strongest hits was a cluster of sites believed to play a role in the closing of the neural tube, leading to critical insights about what factors may contribute to infant anencephaly.

I think the take-home message that I learned from this podcast, and from researching the ways that body donation contributes to science is that there is a large need for such samples and studies. From physicians needing to practice complicated and life-saving surgeries to harnessing the rare and regenerative powers of embryonic stem cells, the contributions of human tissues and cells to biomedical research cannot be understated. As a scientific community, it is our job to respect and properly use these profound gifts as well as to educate the general public on the prolific impact that such studies can have in understanding human disease, our cells, tissues, and bodies.

Sources:
http://www.radiolab.org/story/grays-donation/

Shout out to New External Funding in 2015!

BCMB Training Grant:
Amanda Engstrom
Regan Esposito
Lindsey Knapp
Sabrina Lynn
Kelsey Maher
Ed Quach
Jarred Whitlock

Division Scholar:
Brenda Calderon
Skye Comstra
Julia Omotade
Ed Quach
IMSD: Si’Ana Coggins

LGS Fellowship:
Sabrina Lynn
Kelsey Maher
Elizabeth Minten

ARCS:
Brenda Calderon
Paul Donlin-Asp

Woodruff Fellowship:
Rachel Turn

SIRE: Skye Comstra

AHA: Emily Hunter

IMSD: Si’Ana Coggins

BCMB Training Grant: Amanda Engstrom Regan Esposito Lindsey Knapp Sabrina Lynn Kelsey Maher Ed Quach Jarred Whitlock

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Woodruff Fellowship: Rachel Turn

SIRE: Skye Comstra

AHA: Emily Hunter

Shout out to New External Funding in 2015!

IMSD: Si’Ana Coggins
Clockwise from top left: BCDB 2nd years at the GDBBS Awards Banquet. 4th year students and Director Mike Koval at the Awards Banquet. Josh, Brenda and Skye volcano boarding in Nicaragua. Alicia cave diving in Georgia. 2nd year students dressed up for the Biochemistry Department Halloween Party. Tyler admiring the graffiti in Berlin.
What is the monetary value of a life? Should people be able to afford treatments that could save their lives? Should drugs be made affordable for more people or does intellectual property and capitalist notion take precedent? This year, one man’s vision has caused these questions to be seriously re-evaluated.

DaraPrim is a widely used drug that was first developed as an antimalarial. It has subsequently been utilized to fight a parasitic infection called toxoplasmosis. The second most common food-borne illness, this parasite attacks the brain, leading to neurological damage, seizures and even blindness. Infection can occur by drinking contaminated water, eating undercooked meat or unwashed fruits and vegetables. Many people have been infected but are asymptomatic because of their immune system. Unfortunately, this parasite is deadly to those with weakened immune systems: AIDS patients, cancer patients, and to unborn fetuses of pregnant women.

DaraPrim was developed by GlaxoSmithKline in 1953. After several patent acquisitions, Turing pharmaceuticals came to own the exclusive rights to DaraPrim in 2015. The price of DaraPrim was subsequently increased over 5000% from $13.50 to $750 a pill, the equivalent of walking into a dollar store and seeing Chanel prices. For context, treatment for toxoplasmosis is typically 2 pills a day for 6 weeks costing a patient. A further move that resulted in limiting the accessibility of the drug was to switch a more controlled distribution of DaraPrim, making it more difficult to access to the drug. These alterations to cost and distribution have led to major changes patients who suffer from toxoplasmosis. Treatment for toxoplasmosis is time-sensitive, so drugs must be ready available for patients as any delay may be fatal. Thus, hospitals have begun to use less effective treatments for toxoplasmosis because of changes in availability and costs. Another confounding factor is how insurance companies categorize the drug. They tend to classify high cost drugs as “specialty”, resulting in patients and hospitals having to pay a higher percentage for the drug than those in the “standard” category.

Unfortunately, this is not the only example of a drug rising significantly in price. Such price hikes have happened increasingly over the years. Price increases occur when patent and licensing rights change hands or when companies are acquired or merge together. Another common practice is to remarket existing drugs that have been forgotten for new uses which can change their classification to “specialty”. In addition, drugs follow the economic model of supply and demand where drug shortages often lead to price hikes. For example, after being acquired by Rodelis Therapeutics, Cycloserine, a drug that treats a highly drug-resistant form of tuberculosis, increased in price from about $16 to $360 a pill. Valeant Pharmaceuticals, a company especially known for hiking drug prices, acquired the rights to two heart disease drugs and subsequently raised their prices by 525% and 212%. They also increased the price of a Parkinson’s drug, Tasmar, 575%.

Should drug costs be protected against such flux?

In the current system, there is vehement opposition to certain approaches to new drug development, therapeutic interventions, and potential cures (see part 1). In addition to this, there is a lack of concern, or to put it more accurately, an oversight on how drug prices are regulated.

Drug pricing and the cost of drug development continue to highlight the dichotomy of the research dollar structure. One popular argument is the “tax payers dollars argument”, which reflects the public’s desire to see their tax dollars put to good use towards initiatives they trust. On the other hand, of the taxpayer dollars that goes toward research that lead to new drug developments, it can lead to the marketing of drugs that the majority of the population cannot truly afford even with insurance. This reveals the disparate nature of research: how exactly research should be utilized especially in the context of drug design. Developing a new drug is risky and very expensive and profit incentivizes companies to design new drug. But how much exactly should companies be able to profit from a successful drug?

Martin Shkreli, the CEO of Turing, justifies his actions by stating that the money would be used to develop better treatments for toxoplasmosis, as well as for marketing and educational tools to inform the public of the dangers of toxoplasmosis. He also has pointed out that his company’s actions are entirely legal: “If there was a company that was selling an Aston Martin at the price of a bicycle, and we buy that company and we ask to charge Toyota prices, I don’t think that that should be a crime.” The question remains: Should this be regulated?

Sources:
http://www.newyorker.com/magazine/2015/10/12/taking-on-the-drug-profiteers

Ethics and Public Perception Part 2: Drug Costs

~Jadiel Wasson
Things to do in the Fall in Atlanta

Fall is the perfect time to enjoy Georgia’s many state parks. Take a break from lab and enjoy the cool weather and beautiful fall foliage on a nice hike. Some of the best parks to leaf watch include:

1. **Sweetwater Creek State Park** (30 min away) http://gastateparks.org/SweetwaterCreek
   Just west of Atlanta you can find 9 miles of hiking trails that follow a creek to the ruins of an old mill.

2. **Amicalola Falls State Park** (1.5 hours away) http://gastateparks.org/AmicalolaFalls
   North of Atlanta, this park boasts the tallest waterfall in the southeast and also has a trail leading to Springer Mountain, the southern end of the Appalachian Trail.

3. **Cloudland Canyon State Park** (2 hours away) http://www.gastateparks.org/CloudlandCanyon
   Near the Tennessee border, this park has many scenic views to offer. Explore the canyon floor, take in two beautiful waterfalls, or hike a longer trail for views of neighboring cities and the canyon itself.

Not really into the great outdoors? Looking for something close by? No problem, Atlanta has plenty of new sights to check out this Fall:

Coined as your friendly neighborhood comic bar, this once pop-up shop created by two former Leon’s Full Service and Brick Store Pub workers now has a permanent location in Avondale Estates.
Stop by to enjoy beers, small plates and read or shop from an extensive collection of comic books.

**Ponce City Market**, 675 Ponce De Leon Ave NE http://www.poncecitymarket.com/
This historic Sears, Roebuck and Co. building was renovated into a mixed development with a marketplace, retail shops and offices. The now fully open Food Hall houses 22 dine-in restaurants and market stalls including Holeman & Finch Burger. Swing by for good eats and free live music series every other Thursday.

Clockwise from top left: Sweetwater Creek State Park, Amicalola Falls State Park, and Cloudland Canyon State Park.
The Broadening Experiences in Scientific Training or BEST Program was the NIH’s answer to diversifying the training of PhD students and post docs for careers outside of academia. The NIH administered this approach with competitive grants awarded to select universities across the country. Emory and Georgia Tech were two of the schools awarded this grant and formed a joint venture across the two schools called the Atlanta BEST Program. The Atlanta BEST program is currently in its third year and aims to transform the culture of training by creating new opportunities for trainees, training and mentoring faculty, and alumni who are practicing professionals in research-related careers. The program admits one cohort of 20 to 30 trainees per year for a two-year program. Each trainee then embarks on a path of career development through a series of workshops and experiences, with hopes that the trainee will develop the necessary tools for career exploration and discovery.

This August, the BEST program accepted and is currently training its 3rd cohort. The program is highly recognized on campus and is used as an attractive recruitment tool for prospective students. However, the growing notoriety of the program has led people to question more about the effectiveness of the program. To get a better understanding of the effectiveness of the program, I sat down with Tami Hutto, the project coordinator for the Atlanta BEST program. My first series of questions to Tami were aimed at finding out how the BEST program measures its own success. Understandably so, Tami expressed that measuring the success of the program is difficult, as each result is dependent on the goal of each individual. After a moment of discussion, we agreed that the best measure of the BEST program’s success is the happiness of each trainee and how confident they feel about career exploration. Additionally, Tami noted that a secondary goal of the program is to build a community of support for people that are in the midst of career exploration. As the program is continuing to add to a growing list of trainees, one could say that the program is successful in this front as well. Being the first program of its kind, the BEST program is no stranger to criticism. Next, I wanted to know what the major criticisms of the Best Program were. After discussing with Tami the criticisms from faculty, trainees, and people outside the BEST program, the major theme is a total misunderstanding of what the program is doing. Tami admitted that at times the program has not been the best at communicating what the actual goals are. Over the years the program has been working on making this communication better and handling the critics by better managing expectations. Tami’s ending words to me summed up the goals of the BEST Program, reminding me that the Program is geared at forming a community that promotes career exploration and professional development with the goal of empowering trainees to make informed career decisions and achieve their career goals.

As a current BEST trainee, I would like to also elaborate on my own experience. Like many trainees, I had a misconstrued idea of exactly what the BEST program was going to offer. I expected that I would know my career options within weeks of entering into the program and the program would use all of its resources to ensure that I got a job. However, this was not the case. I eventually became frustrated with the program because I did not have a full understanding of what it was doing and the fact that it was not what I had envisioned. After spending more time in the program, I began to realize that the program was more about helping individuals become more self aware about their own interest and values and training them to become career discoverers. Additionally, I became more aware of the community that the program was forming. At the conclusion of my first year, I felt more confident about what my career options were after graduating and my ability to explore career options on my own. So in thinking back on how the BEST program measures success, I would say that at least with me, the program accomplished its goal.
On Friday, October 23rd the BCDB Training Grant hosted its annual career symposium, offering graduate students and post-docs a chance to explore job opportunities outside the realm of academia. While a wealth of knowledge on the academic career path is available to students from faculty and advisors, comparatively fewer resources are available for students to learn about alternative career options. As such, the theme for this year’s event was “Business Careers in Science: Thinking Beyond the Bench”, focusing on exploring a variety of employment options for Ph.D.’s in the private sector.

Several professionals were invited to speak for the event, and all have a previous connection to Emory University. First was Dr. Paul Musille, a member of the MSP program and graduate student in Eric Ortland’s lab. Before defending his thesis in 2014, Dr. Musille worked in the Office of Technology Transfer at Emory. Here he gained experience in managing the delicate process of migrating technologies developed in the public sector, such as in university research labs, over to the private sector. Currently, Dr. Musille works as a consultant for NineSigma, an emerging firm which searches for unconventional solutions to a variety of biotechnical problems. The second speaker was Dr. Sharon Soucek, a graduate of the BCDB program in 2014. While at Emory she worked in the lab of Anita Corbett, and also did an internship at the Office of Technology Transfer. Before graduate school, Dr. Soucek explored several training opportunities in industry, working both with the Switzerland-based biotech company Arpida, and the U.S.-based pharmaceuticals company Abbott. She is currently a Technology Transfer Specialist for the Center for Disease Control and Prevention (CDC). The final speaker was Dr. Bruce Conway, a long-time friend of BCDB’s own Dr. Larry Boise. Dr. Conway was a post-doctoral fellow at the University of Massachusetts Medical Center, was both a researcher and the Program Director at Johnson and Johnson for over ten years, and was the Senior Director of Pharmacology and Biology at the Institute for Drug Discovery until 2012. Currently, Dr. Conway works as the Program Director of the Robertson Therapeutic Development Fund at Rockefeller University.

The speakers spent the morning interacting with students on a more individual level, offering advice about their careers in a series of small group conference meetings. Next, first year BCDB students had the chance to engage with the guests over a relaxed luncheon, and ask questions. Finally, the culminated in the title talk in the afternoon, where students, post-docs, and faculty from a variety of departments attended to gain insight on potential career options. The speakers touched on their personal backgrounds and professional experiences, how they prepared themselves to obtain their current jobs, and how they manage the challenges of their careers. After a successful question and answer section, the day wound down with a happy hour, generously provided by the Cell Biology Department.

The next event hosted by the BCDB Training Grant will be the Speaker Seminar Series, taking place this upcoming spring on March 18th. The invited speaker is Dr. Zena Werb, a highly decorated academic who received her Ph.D. from Rockefeller University, and now conducts her research at the University of California, San Francisco. Dr. Werb work on a variety of projects, including the regulation of inflammation, stem cell quiescence, and tumorigenesis, especially in how these processes relate to breast cancer. The majority of her research, however, focuses on the proteolysis of metalloproteinases, and how this may act as a mechanism for signaling in the extracellular matrix. Dr. Werb is renowned as a giant in her field, and all are encouraged to take the chance learn more about her work and her experiences by attending the spring seminar. ◊
I am currently working on Senator Johnny Isakson’s 2016 re-election campaign. I work on the finance team that handles all political donations, plans and organizes political fundraisers and ensures that all practices fall within the guidelines of the federal election commission (FEC). I work in an office of five people so in reality we all work together on all of these tasks as well as grassroots campaign efforts and campaign events. Getting into politics from science was not a direct path but it is achievable. I started this transition my third year in graduate school by working with national science organizations to participate in Hill days in DC where we would meet with Congressmen to discuss funding for the NIH, helping start and run a student science advocacy group at Emory, and joining the BEST program. At the beginning of my fourth year, I went out on my own and secured an internship with the office of government and community affairs at Emory. The internship was the most important experience I had while at Emory that directly led to my opportunity to join Senator Isakson’s team. During my internship, I worked directly under the advisement of the Vice President, Charlie Harman. Mr. Harman was instrumental in getting me an interview with the Isakson campaign and eventually the job. The internship was not easy – juggling a part time internship (20 hours a week) on top of being a full time graduate student was a struggle but if you want to transition out of science certain sacrifices will have to be made. I spent a lot more nights and weekends in the lab to make-up the time I was out during the week but it was all worth it. After the internship ended, I was on track to graduate. Within the same three months I wrote my dissertation, put together a resume, went on job interviews, completed my defense and right at the end got my current job. There were a lot of skills I learned as a graduate student that have been crucial to my new job – attention to detail, conducting group meetings (like leading a committee meeting), putting together and communicating relevant information and ideas (similar to seminars and lab meetings), the ability to problem solve and see multiple angles to issues, and the ability to prioritize my tasks and execute independently.

~ Chelsey Ruppersburg
Summer 2015

As I was finishing up my last year in the BCDB program, I began to look for postdoctoral positions in cancer stem cell or sarcoma research. One day, my mentor suggested I contact Dr. Charles Keller. He specialized in sarcoma biology but also worked with canines to develop therapeutic approaches for cancer patients. It was the perfect scenario for my future career plans. I sent him an inquiry letter and my CV. He contacted me, we had a phone interview, and he chose a different applicant. Several months later, I had contacted many other investigators with no success in finding a postdoctoral position. My mentor suggested I contact Dr. Keller again. I did. He still did not have a position for me but offered to keep me in mind if he knew of any labs that might be a good fit for me. Two months later…Dr. Keller called me, said he had a position available, and offered me a post-doctorate position. I am now working with Dr. Keller and the Children’s Cancer Therapy Development Institute on research that will ultimately benefit both children and veterinary patients. If it had not been for the encouragement of my mentor to be tenacious, I probably would not be where I am today. This may not be the typical “how to get a postdoc” story, but knowing your dream, your passion and pursuing it with determination and tenacity are applicable to all of us.

~Matthew Randolph
Spring 2015
THE CHEMISTRY OF THE COLOURS OF AUTUMN LEAVES

CHLOROPHYLL

LUTERIN
A type of carotenoid

Carotenoids and flavonoid pigments are always present in leaves, but as chlorophyll is broken down in the autumn their colours come to the fore. Xanthophylls, a subclass of carotenoids, are responsible for the yellow of autumn leaves. One of the major xanthophylls, lutein, is also the compound that contributes towards the yellow colour of egg yolks.

CAROTENOID & FLAVONOIDS

FLAVONOL (general structure)
FLAVONE (general structure)

CAROTENOID

BETA-CAROTENE
A type of carotenoid

Carotenoids can also contribute orange colours. Beta-carotene is one of the most common carotenoids in plants, and absorbs green and blue light strongly, reflecting red and yellow light and causing its orange appearance. It is also responsible for the orange colouration of carrots.

ANTHOCYANINS & CAROTENOID

LYCOPENE
A type of carotenoid

Unlike the carotenoids, anthocyanin synthesis is kick-started by the onset of autumn - as sugar concentration in the leaves increases, sunlight initiates anthocyanin production. The purpose they serve isn’t clear, but it’s been suggested that they help protect the leaves from excess light, prolonging the amount of time before they fall.