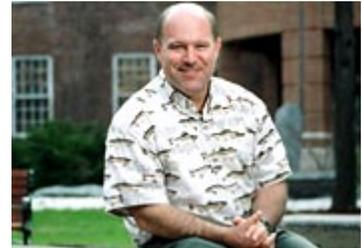


# BIOLOGY matters

Spring 2013

**A note from the Chair** – I don't often quote from the Bible, but as stated in the Book of Ecclesiastes (3:1-8), set to music by Pete Seeger, and turned into an international hit in 1965 by the folk-rock band *The Byrds* – "... to everything there is a season..." ([Turn, Turn, Turn](#); if you want to sing along). This is my last semester as Chair of the Biology Department, as the position turns/turns/turns over every few years. It has been a pleasure to serve in this role over the last three years – years that have seen continued growth to our program from many prior years of success due largely to our "put the needs of the students first" attitude. We continue to attract very fine people – both faculty and students – and together do our best to prepare our students for the future. Our track record has been and remains very good in this area – with several examples highlighted later in this issue of *Biology Matters*. We also benefit tremendously from the positive energy and feedback of our alumni, who keep in touch and recommend our program to prospective students – so thanks very much for that support. I look forward to putting more time and focus back toward teaching and scholarship now that less time will be occupied by administrative responsibilities. Beginning July 1, the position of Department Chair will be in the very capable hands of my good colleague, Declan McCabe.



Here is a recent photo of our faculty (unfortunately Adam Weaver was unable to join us at the time). Pictured from left to right: Declan McCabe, Mac Lippert, Scott Lewins, Dagan Loisel, Valerie Banschbach, Peter Hope, Mark Lubkowitz, Denise Martin, Donna Bozzone, Laura Dapkiewicz, Doug Facey.

## NEWS UPDATES

### Honors for our students:

Each year, many of our Biology majors are inducted to various honor societies in recognition of their outstanding accomplishments in academics and research. This spring, we are pleased to recognize the following inductees:

**Phi Beta Kappa:** Mitch Akey, Jackie Cronin, Alison Lajoie, Jillian Means, Jared Peick, Jessica Sprague, Marci Wood

**Beta Beta Beta (Tri-Beta):** Full members - Amanda Costa, Kate Cullen, Lauren DiBona, Emily Dieter, Lauren Haskins, Erin Kiernan, Hannah Kittler, Nicholas Kyratzis, Lauren Loy, Eric MacPherson, Hillary Miller, Michael Minasi, Jared Peick, Devan Piniewski, Courtney Pinto, Marci Wood, Nicole Wright. Associate members - Michelle O'Donnell, Christopher Ricciardi

**Sigma Xi, the Scientific Research Society:** Patrick Bousquet, Anne Burnham, Chad Chapman, Charles Cubberly, Jacqueline Cronin, Alison Lajoie, Jared Peick, John Reiser, Marci Wood

Congratulations to **Ashley Lincoln**, who recently received a Vermont Campus Compact Engaged Student Award in part for her work through MOVE on several issues, including "Cause for Paws", the "Dear Hillary" campaign, and her leadership in the "Join Hands for Congo" rally at the U. S. State Department (see this [link](#)).

### **Congratulations to students moving on to graduate programs:**

**Chrissy Skrzat** - Master of Healthcare Ethics program at Duquesne University

**Marci Wood, Ryan Cady, and Jonna Peryer** - Albany College of Pharmacy (Colchester campus)

**John Reiser** - PhD program in Molecular Medicine at the University of Maryland

**Anne Burnham** - MS program at SUNY ESF (Environmental Science and Forestry) in Syracuse

**Lisa D'Angelo** - Western New England University College of Pharmacy

**Jessica Sprague** - Master of Nutrition Science and Policy program at Tufts University

### **Professor Valerie Banschbach receives Fulbright Scholarship to work in India in Fall 2013**



*(this entry edited from initial article by Buff Lindau)*

Biology professor Valerie Banschbach, who also has been serving as chair of the SMC Environmental Studies program has been named a U. S. Fulbright Scholar. Professor Banschbach will spend five months in India starting in the fall of 2013 teaching and researching organic versus conventional farms, in collaboration with the Wildlife Institute of India.

Professor Banschbach's Fulbright topic is titled "*Ecology and Conservation of Biodiversity: Ants as Bioindicators to Assess Impacts of Organic Farming in India.*" This project came out of a three-year experience working with Indian farming programs. Her Fulbright work will expand her U.S.-based research on ants as bio-indicators for answering agricultural questions.

Focusing on ant diversity, Professor Banschbach, an entomologist, expects her research to yield theoretical results and practical insights for Indian farmers. Her work evolved from the 2010 launch of the Environmental Studies major at Saint Michael's, which was inaugurated with a talk by scientist, Vandana Shiva. Professor Shiva is founder of Navdanya's Farm, an organic training center in the city of Dehradun, India, home to the Wildlife Institute of India.

Professor Shiva reciprocated with an invitation to Professor Banschbach to visit Navdanya's Farm and the Wildlife Institute in spring 2011, where she witnessed impressive grassroots efforts of researchers and students to improve their communities through farming advances. Professor Banschbach returned to India in summer 2012 and taught "Organic Agriculture and Conservation of Biodiversity" for 12 Saint Michael's students with the participation of two additional professors.

"The experience will leave me well prepared to bring future Saint Michael's students to India in study abroad courses and to deepen the relationship between Saint Michael's and India," she wrote in her proposal.

"Given that the richness of India's ecosystems is coupled with high human population density and development pressure, the stresses on natural systems are enormous, creating many difficult ramifications for people and non-human species," Professor Banschbach wrote in her Fulbright proposal.

India has more than 400,000 organic farms. Ants can provide scientists much information about farms, she says, even though often they are "overlooked in favor of often-celebrated earthworms."

The Fulbright grant provides Professor Banschbach with five months' funding for teaching and research, along

with travel, board and schooling expenses allowing her to bring her husband and two daughters, age 12 and 8. "It will be exciting for all of us," she said.

## RESEARCH UPDATES

**Population Genetics research with Professor Dagan Loisel** - This summer, two students will be working in Professor Loisel's research lab. **Tommy Manning's** project, "Immune genetic variation in the Vermont population of Eastern Bobcats (*Lynx rufus*)" will be examining the genetic diversity of immune system genes in 90 wild bobcat DNA samples. The goal is to examine the levels and patterns of sequence diversity in several essential immune genes to gain insight into population genetic diversity in the bobcats. **Hannah Lynch's** project, "Association between variation at site 874 of the *IFNG* gene and risk of pre-eclampsia" will involve examining data collected by collaborators at the University of Chicago to test for associations between genetic variation in a candidate gene, *IFNG*, and the risk of the pregnancy disorder, pre-eclampsia. Both projects will involve many of the laboratory techniques taught in the Population and Evolutionary Genetics course, including DNA extraction, PCR amplification, DNA cleanup, Sanger sequencing, and DNA sequence analysis.

**NSF funded plant molecular biology research continues** - For the third consecutive summer, several students will be employed by Professor Lubkowitz's research project exploring the regulation of carbohydrate partitioning in plants. Carbohydrate partitioning is the process by which carbohydrates move within plants from tissues where they are synthesized to regions where they are stored or consumed. This process is critical to food and biofuel production as well as offsetting CO<sub>2</sub> in the atmosphere. This summer eight SMC students will travel to various collaborator's labs to do research on some aspect of carbohydrate partitioning. **Brianne Conlon, Harry Klein, Chloe Boutelle** will be at the University of Florida; **Emily Dieter** and **Molly McGovern** will work at the University of Missouri; **Lauren Miranda** and **Meghan Ahearn** will spend their summer at Purdue; and **Isaiah St. Pierre** will complete his research at the University of Nebraska.

**Vermont EPSCoR macroinvertebrate and water chemistry research continues:** Seven students will be working this summer with Professor McCabe's ongoing streams project: four on macroinvertebrate research and three on water quality changes in Vermont streams. **Hannah Kittler** (SMC '15) and **Devan Piniewski** (SMC '14) will be joined by two students from the University of Puerto Rico and work on projects in Lake Champlain and its tributaries. **Marissa Smith** (SMC '14) and **Carlos Sian** (SMC '15) will be joined by a student from the Community College of Vermont to measure water-quality responses to land use in Missisquoi River and Winooski River tributaries. Together with collaborators from the University of Vermont and Middlebury College, we will crisscross Missisquoi Bay and take lake-floor samples on a regular grid pattern. The samples will be divided with portions sent to Middlebury for sediment grain size analysis and the remaining material sieved for macroinvertebrates to be identified at Saint Michael's College. Results will be used to examine the relationships between macroinvertebrate communities and habitat variables in Missisquoi Bay. Projects in the tributary streams will include an expansion of ongoing work relating stream macroinvertebrate communities to sediment load in Winooski River tributaries. Research will begin on May 24 and continue through Mid-August.

**Research at Camp Johnson continues** - **Hillary Miller** ('15) and **Megan Roush** ('15) both received VPAA



student summer research grants to work with Professor Valerie Banschbach at Camp Johnson to monitor the results of a controlled burn that took place on May 3. The Biology Department at Saint Mike's is funding the controlled burn using the John C. Hartnett Endowment in order to provide enhanced research opportunities for upper-level student researchers, students in Biology 151 (Introduction to



Ecology and Evolution), and faculty. The burn provides an opportunity to bolster our study of fire restoration of

this threatened sandplain forest ecosystem since the Vermont Army National Guard Base at Camp Johnson contains the largest remnant of this ecosystem in Chittenden County. Megan Roush will collect data related to the use of ants as bioindicators, assessing the impacts of the burn on the ant community, in relation to changes in the vegetation. Hillary Miller will focus her work on the behavior of the most common and dominant ant species in many New England forests, *Aphaenogaster rudis*, and assess how the species unique foraging strategy (tool use) is impacted by the post-burn conditions.

**US Fish and Wildlife Service Summer Internships - Spencer Mallette ('14, Biology) and Cooper Quenneville ('14, Environmental Studies)** will both be working as interns for the US Fish and Wildlife Service this coming summer on a variety of stream and riparian habitat studies. Saint Michael's ongoing agreement with the local USFWS office has resulted in summer placements for one or two students for over 10 years.

## CONFERENCE PRESENTATIONS

**East Coast Nerve Net conference - Marci Wood and Ali Lajoie** accompanied Professor Adam Weaver to the annual East Coast Nerve Net conference in Amherst, Massachusetts in late March. Marci and Ali presented a talk on their summer research project, "Further Electrophysiological Characterization of Neurons in the Ribbon Leech – *Nephelopsis obscura*."

**55<sup>th</sup> Annual Maize Genetics Conference** – five students traveled to Chicago in March with Professor Mark Lubkowitz to present their summer research:

**Stephanie Locke** *C-partitioning: nutrient transport-related genes in the UniformMu maize population*

**Heidi Chapman** *Got Starch? Decoding the Carbon partitioning defective (Cpd4) mutant gene in maize*

**Charles Chapman** *Hunting the recessive Carbon partitioning defective5 mutant in maize*

**Amanda Costa** *UniformMu insertions in gene for Regulator of Chromosome Condensation (RCC1) correlate with empty pericarp phenotype*

**Frank Gilcreast** *Carbohydrate Analysis by ion mobility spectrometry-mass spectrometry*

## STUDENT PROFILES

### Marci Wood



**Hometown:** Chateaugay, NY

**Career interest:** Pharmacy

**What has your Saint Michael's experience, particularly your experience as a Biology major, been like?** My experience as a St. Mike's biology major has been outstanding. The small class sizes, awesome faculty, and many different opportunities I've had really have made my experience in the biology program special. Every biology professor I've had at St. Mike's has a passion for teaching. It's great to know that as a student I am supported by my professors and I can ask them any questions I have. I've gained a strong education during my time at St. Mike's and feel very prepared to begin pharmacy school in the fall because of this education.

**What additional activities did you pursue related to the biology major?** I spent last summer doing research in Professor Adam Weaver's leech lab. Obtaining research experience as an undergraduate student is a great

opportunity. My fellow researcher Ali and I attended the East Coast Nerve Net conference in March and gave a talk about our research. I also had the opportunity to take the Tropical Ecology course with Professors Hope and Lewins and go to Costa Rica for 2 weeks this past winter break, which was such a cool learning experience! Since I didn't have time to spend a semester abroad, I was grateful that the biology department offers this course and enjoyed going to Costa Rica with other students interested in biology and professors so knowledgeable about the subject.

**Post-graduation plans:** In the fall I will begin taking classes at Albany College of Pharmacy's campus in Colchester, VT (a 4 year program).

## Chad Chapman



**Hometown:** East Burke, VT

**Career interest:** Cell biology, genetics, physiology

**What has your Saint Michael's experience, particularly your experience as a Biology major, been like?** When I started here at St. Mike's I was an "exploratory" major with very little thought of pursuing the sciences. In fact my first year schedule was suited much more for an economist or businessman than a scientist. However, all this changed when Dr. Van Houten, an avid chemistry recruiter and my advisor at the time, convinced me to give the sciences a chance. I enrolled in the general biology course the first semester of my sophomore year and never looked back.

From the onset of my biology career with Dr. Doug Green in BI-151 I have had nothing but positive experiences. The professors in the Biology department here at St. Mike's really care about the learning of each student and are always willing to lend their time to help you succeed. Along with this, the ability to participate in a hands-on lab portion of each course allows you to experiment and mature as a scientist in a way that isn't as accessible at a large university. Finally, I'm not sure if I would have ever fostered a love for the sciences if it wasn't for the passion and dedication of my professors and for this I will always be thankful.

**Research:** Over this past summer I was given the opportunity to work in Dr. David Braun's lab at the University of Missouri on a collaborative project which is utilizing both genetic and genomic approaches to understand the long distance transport and partitioning of carbon in plants. More specifically my work in Dr. Braun's lab was aimed at mapping the mutations of three different maize (corn) mutants to their respective locations within the maize genome.

**Other experience:** During my first two years here at St. Mike's I was a member of the Men's Soccer team. Being a student-athlete meant often having to juggle the requirements of both my professors and my coach but looking back I wouldn't have traded the experience for anything. Being a student-athlete allowed me to develop the type of discipline necessary to be successful in the field of Biology. I want to thank all of my professors for their flexibility and understanding when it came to athletic scheduling conflicts while still holding me to the same academic standards as the rest of the student body.

**Post-graduation plans:** Graduate school is certainly in the cards for me, however, I opted out of applying right away as I am still in the process of narrowing my focus. As for now I am actively seeking a summer research position in an attempt to further my research experience and develop a better understanding of my area of interest.

## ALUMNI NEWS & PROFILES

*Happy Anniversary* to **Colby Salerno** ('10) and his family and friends as they celebrate one year since his May 29, 2012 heart transplant. You can learn more about Colby's battle with hypertrophic cardiomyopathy, which finally resulted in the transplant, and his advocacy for organ donation, on this half hour [documentary](#) produced by a Connecticut TV station. Colby's determination and spirit are an inspiration to all of us at St. Mike's.

**Alex Miller** - class of 2010



**Current position:** I recently accepted a position as a mid-level environmental scientist at AMEC. The consulting work primarily involves environmental site assessments, design and oversight of groundwater monitoring wells and remediation projects of remediation for oil and gas clients.

**Background:** I was raised in Benton, Maine and attended SMC after graduating from Lawrence High School in 2006. I graduated from SMC in 2010 with a BS in Biology. In 2011, I accepted a Research Assistantship in an Environmental Science program at the University of Houston- Clear Lake in Houston, TX. I will be graduating this May with a MS in Environmental Science.

**What got you interested in your current field?** Since coming to Texas, I have met several geologists, engineers and other people that work in the oil and gas sector. They discussed with me the integral role that environmental scientist play in the operation and maintenance of drilling sites.

**What led you down the path to where you are now?** I always knew that I wanted to work outside, but never guessed that I would end up in Houston, TX working in the oil and gas sector. When I first went to SMC, I was not sure what direction I wanted to go, just that I enjoyed learning biology. During my junior year, I spoke with my advisor, Dr. Banschbach, about summer research possibilities and my interest in fisheries. She put me in contact with Dr. Facey and we developed a year-long project researching the diet selectivity of White Perch. The summer between my junior and senior year, I also got an internship with fisheries biologist, Madeleine Lyttle, at the US Fish and Wildlife Service. Three days after graduating from SMC, I went to work for the Colorado Division of Wildlife in Monte Vista, CO as an aquatic technician. This was a 6 month seasonal job managing fisheries of the San Luis Valley which includes the headwaters of the Rio Grande River. The following summer I began my RA with the University of Houston- Clear Lake. My thesis research evaluated the multi-decadal changes in the nekton community of a major riverine Texas estuary. I also gained a breadth of experience with surface water quality monitoring, wetland delineating and terrestrial ecology. As graduation loomed, I recognized that this was a pivotal opportunity to expand my horizons even further and gain more experience. Occupations related to oil and gas have remained recession proof and was one of my strongest options.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** Saint Michael's provided a solid foundation for me to fall back on in a wide variety of settings. The scientific writing course that most take as sophomores, which at the time was my least favorite, was probably the single most important class I can point to as making a difference. I recognized this first when entering graduate school and my peers struggled to synthesize, write and present on a compilation of journal articles. In all of my biology classes at SMC we were required to orally present our mini-lab designs and results. This gave me the confidence to present my current research at state, regional and international conferences. From these presentations, I made several professional connections and future opportunities.

I would not have received my first job offer to work in Colorado if I had not had the internship with USFWS. My boss informed me after accepting the position that he weeded out the resumes first based on whether or not people had certain fish sampling skills. The success I have had in grad school is largely due to my experience designing, implementing and writing my undergraduate research on White Perch.

My current employer at AMEC recognized that I did not have the exact skill set required, but told me that my resume stood out because it was well composed. I sought assistance from career counselor, Donna Atwater, before graduating on resume writing and this is a skill that has carried over through several applications. He told me that he interviewed 5% of the applicants for the job of environmental scientist and was willing to take a chance on me, even though I did not have the exact skill set, because I had the intangibles that are nurtured in the SMC biology department: critical thinking, communication and self-motivated.

**Do you have any advice for students interested in your field?** The job market is flooded with people who have Bachelor of Science degrees. I would recommend students to remain open and optimistic to new ideas. Employers are looking to hire young, talented people that have writing skills, work well in teams, can solve problems and are enthusiastic. Management can train the specific technical skills if you already have a solid background.

**Are there specific opportunities you think biology majors should pursue before graduation?** I would highly recommend getting an internship, applying for independent study or simply volunteering. These can help aid you in future career decisions and build contacts in the community.

**What advice would you give current Saint Michael's College students interested in graduate study and/or specifically interested in your field?** My graduate professor will not look at applicants if they lack professional experience. He wants applicants to enter the lab with pre-existing knowledge of a professional work environment. A year off between undergraduate and graduate school gave me time to recharge the batteries and recognize the need for further education. Graduate school has been a grueling two years, but the days of technician grunt work established the thirst to commit to a Master's program.

**Kelly Fitzgerald** - class of 2009.



**Current position:** I am a second year dental student at Tufts University School of Dental Medicine, and will graduate with my DMD in 2015.

**Background:** I am from Barre, Vermont, and received my BS in Biology from SMC.

**What got you interested in your current field?** I always knew I wanted to pursue a career in the medical field, and dentistry was something I thought might be a good fit. I was one of those weird kids that really looked forward to going to the dentist, and had nothing but great experiences there. But, it wasn't until I graduated from SMC and worked as a dental assistant that I really fell in love with the field. I loved the interaction with the patients, and the idea of developing life-long relationships with them and their families. Caring for another person's health and well-being is such a huge responsibility and privilege. I'm so grateful to have the opportunity to be instilled with that level of trust.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** I owe so much to the amazing mentors and educators I encountered while I was at SMC. The community is so wonderful and supportive. The classes/curriculum really prepared me for the DAT (the entrance exam for dental school). Dr. Bozzone, and my advisor, Dr. McCabe, gave me so much guidance when applying. I applied almost two years after graduating, and even after the time lapse, they were so accommodating throughout the whole process.

**Do you have any advice for students interested in your field?** My advice would be to work really hard. These programs are very competitive, and it's long road, but if it's what you love it is SO worth it! Also, try to get experience in the field you are interested in (get a part time job assisting, focus a research project around it, or just shadow someone). SMC is great because there are so many opportunities to do something more!

**Are there specific opportunities you think biology majors should pursue before graduation?** Whether you are considering dental school or any other post collegiate education, you can't go wrong with getting more involved at SMC. You need to be dedicated to your education both in and out of the classroom. I did research during the summer of my second year, played on the women's lacrosse team and was a co-captain my senior year, did work-study in the chemistry department, tutored a high school student in math, worked part-time at the Church Street mall, and volunteered in the ED at Fletcher Allen. Getting involved made those four precious years so much more memorable and worthwhile.

**Dan Borkowski** - class of 2008



**Current position:** PhD Candidate, Romero-Severson Lab, University of Notre Dame

**Background** I grew up in Ludlow, MA and attended Saint Mike's from 2004-2008. I majored in Biology with a minor in English Literature.

**What got you interested in your current field?** I have had an interest in science for as long as I can remember and knew from a very early age that I wanted to study some field within biology. Like a lot of children, I was fascinated by dinosaurs and idolized paleontologists like Jack Horner (and the fictional Alan Grant). Paleontology led me to read about evolution and the history of life. Then, after taking several courses at Saint Mike's involving ecology, genetics and evolution, I knew I wanted to specialize in population and ecological genetics.

**What led you down the path to where you are now?** Throughout my coursework in biology, I was provided great guidance by my advisor, Prof. McCabe, as well as several other faculty members in the department. The entire faculty at St. Mike's were great at allowing students like myself explore our interests, yet guide us into figuring out what field(s) we should focus on for our future careers. Further, I was afforded the opportunity to be an intern at the US Fish and Wildlife Lake Champlain Station in Essex Junction. I learned not only important computer skills, such as ArcGIS, but I also got a lot of field experience, which made me sure that I wanted to pursue research with a significant field component. Another key experience was taking the Tropical Ecology course with Profs. Banschbach and Hope. Performing lab exercises in the forests of Costa Rica further solidified my interests in the field.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** The opportunity to be exposed to so many different disciplines was probably one of the most useful experiences at Saint Mike's. The faculty encourage curiosity and allow students to pursue their interests within the structure and subject matter of the class. Being able to actively find interesting questions to pursue in my research has greatly enriched my graduate career. Having so many faculty around to ask questions and advise you as a student really helped me decide which skill sets to hone and how to go about applying to graduate schools. Also, having the opportunity to form an informal evolutionary biology journal club under the guidance of the late Dr. Green my senior year, greatly prepared me for reading and understanding the literature once I started graduate school.

**Do you have any advice for students interested in your field?** I would recommend that any student interested in being a graduate student either do undergraduate research or an internship for at least a year. The classes at Saint Mike's are great at preparing you academically for post-grad work, but these other opportunities offered by or through the department allow you to get a sense for what actually awaits for you after you get your degree from the college. Also, do not be afraid to take classes that sound interesting but are outside your focus. I have been surprised how many times I have found that taking that extra evolution course or even Ancient Greek to be useful.

**Are there specific opportunities you think biology majors should pursue before graduation?** As I stated above, I cannot stress how important getting some outside research or intern experience is to someone thinking about entering graduate school.

**What advice would you give current Saint Michael's College students interested in graduate study and/or specifically interested in your field?** I would recommend that you make sure you know what you want to study before you apply to graduate school. It is usually 4-6 years to get a PhD, so if you are not sure, don't dive headfirst into a program, but instead either go to school for a Masters in Biology or get a job in a lab as a technician or lab manager. The exposure to academia or the private sector will greatly inform your decision of whether or not you want to pursue a 5 year degree.

**Chelsea Myers** - class of 2011



**Current position:** Lab Manager at the Laboratory for Educational Neuroscience at the University of California, San Francisco, in the Department of Psychiatry.

**Background:** I grew up not far from St. Michael's College in Colchester, Vermont. I graduated with a major in Biology and a minor in Spanish.

**What got you interested in your current field? What led you down the path to where you are now?** My plan throughout college was to fulfill all of my prerequisites for medical school, take a year off after I completed my undergraduate degree, and then return to complete an MD, presumably in a subfield related to neurology. Shortly after I graduated, I began working at Fletcher Allen Health Care as an orderly. The position allowed me to gain a broad perspective of the hospital and how it operates. After a short time, I decided that the medical profession that I had dreamed about for quite some time was not really for me. While I still had and have an extreme passion for health, I found that medical school was not the path I wanted to take anymore. So, I decided to pursue another passion of mine -- education, and I took a position as the coordinator of an afterschool program for the Grand Isle Supervisory Union. In this position, I was able to teach science and other fun courses to students of all ages. I loved it! Still, I missed the creative allure of research, so I began looking for jobs again.

I visited San Francisco in March of last year and loved the atmosphere at UCSF. Soon after my visit, I was offered a position as a Lab Manager/ Research Assistant in a blossoming lab for educational neuroscience under the guidance of the talented Dr. Fumiko Hoeft. The lab utilizes neuroimaging, particularly magnetic resonance imaging (MRI), to study learning disorders and other aspects of neurological development in young children. Two weeks after accepting the position, I packed up a suitcase and moved to San Francisco, where I have been ever since.

My current position, I have found, is the perfect fusion of my passions for education, health, research (particularly research on human subjects), and outreach. I firmly believe that all of my experiences since graduation, no matter how scattered they seem, were a true progression and exploration of my interests.

**What are your plans for the future?** The position at UCSF has opened the doors to many exciting opportunities to advance my knowledge in the field. Currently, I am looking forward to presenting at both the Association for

Psychological Science in Washington, DC and the Society for the Scientific Study for Reading in Hong Kong coming up later this year. I am awaiting the publication of a book chapter I coauthored and am currently writing my first manuscript.

In the meantime, I am busy researching PhD programs in Clinical Neuropsychology as well as Educational Neuroscience-related fields. I plan to apply to doctoral programs later this year. I hope to continue studying learning disabilities and other neurodevelopmental conditions and apply these skills to research, practice, and policy in the future.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** First of all, I am only just beginning, and I am certainly not at any stopping point; but I will speak to where I am today and to the direction that I hope to be heading.

Professor Hope's Biology Reading and Writing course (now called Communications in the Biological Sciences) was the perfect preparation for exactly what the title implies, reading and writing in the sciences. The class enhanced critical reading skills and taught efficiency while being thorough. Professor Hope always provided valuable feedback on our work and embraced the process and the product, rather than just one or the other. I will always remember it as being one of my favorite courses, in part due to the fact that the group we had was fun, hardworking, and receptive to feedback.

Of course, my summer research experience with Drs. Green and Bozzone taught me not only about specific microbiology and cellular biology techniques, but also about the importance of continuing to question, while remaining organized and up to date in the research. I was able to experience the research process step by step, from writing the grant to presenting my research at the end of my senior year. I must say, it was a struggle and certainly not the cleanest results (when is research, really?), but I learned so much about the process of the scientific method from that summer and from my senior honors thesis. I will never forget our round table discussions in the mornings to get caught up, discuss future plans, and just bounce ideas off our mentors about the rapidly approaching decisions we would be making about our careers.

Dr. Bozzone was also invaluable as a pre-medical school advisor. She encouraged me to explore my options and take a bit of time to figure out if it was really for me. Without her advice, I probably would have attempted to go straight to medical school, without a clear picture of what the career really entailed. And her requirement for literature summaries is something I will probably never stop using, no matter how tedious they seemed back then!

The opportunity to be a teaching assistant, tutor, and member of the biological honor society (Tri-Beta) were all additional opportunities for me to enhance my passion for leadership in the sciences. The community in the biology department is always something that I will look back on fondly as I continue to interact with a network of scientists.

**Do you have any advice for students interested in your field?** If you have the time in your schedule, without getting too bogged down, never pass up opportunities for research or related internships. There are a variety of great opportunities for undergraduate students in a number of locations, and it is a great way to explore careers in the sciences, even if you don't see yourself as being a researcher. My advice -- just explore and embrace any opportunities that you can!

I would also say not to feel pressured to know exactly what you want to do for a career right away. Take the time to check out different options. A decision such as going to medical school involves a huge investment of both time and money, so you want to be sure it's what you want before you make the commitment.

Ask questions, lots of them. Take advantage of the wide expertise that the Biology Department has to offer. The professors are always open for discussion and want their students to succeed. I am almost certain that I can remember at least one conversation with each professor in the department that has shaped my perception of the

field in some way and has led me to where I am today.

**Are there specific opportunities you think biology majors should pursue before graduation?** I think I might have answered this already but, to reiterate, research, volunteer, and be involved with anything you can. I would also say that the beauty of the liberal arts education is that there is such variety in the avenues that you pursue. Don't be afraid to try out other options and explore all of your passions. Science is getting more and more interdisciplinary as time goes on, so it is a good idea to be well-versed in a variety of fields.

**What advice would you give current Saint Michael's College students interested in graduate study and/or specifically interested in your field?** In addition to the things I have already mentioned, I would suggest taking more math courses, especially statistics. You will use them! Also, develop a network as much as you can while you are at St. Michael's College; who you know and can connect with will be invaluable to your future endeavors. Leave as many doors open as you can.

**Nathan Schoenly** – class of 2008



**Current position:** Endodontics Resident at the University at Buffalo School of Dental Medicine

**Background:** I'm originally from Weymouth, MA and graduated from SMC in 2008 with a double major in Biology and English Literature. In 2012, I earned my Doctor of Dental Surgery (DDS) from the University at Buffalo School of Dental Medicine with a concentration in Endodontics (root canal therapy). I'm currently working toward becoming a specialist in endodontics and will earn my certification in 2014.

**What got you interested in your current field?** - I would be kidding if I said I planned on being a dentist from the get-go. I didn't even know what a "root canal" was until dental school. Like many incoming freshman at SMC, my major was "exploratory" when I first started. I decided to start with a major in English during my first few months but all my closest friends in Joyce Hall were Bio majors. I envied their camaraderie and deep interest in the subject so I decided to take on Bio as a second major at the start of my sophomore year. I think it was the genetics research I completed with Prof. Lippert and the class in Comparative Vertebrate Anatomy with Prof. Green that sparked my interest in a career related to medicine. I also met a very close friend, Anna Marie Messenger, a fellow Bio major, while spending a summer at SMC who introduced me to her father who is a dentist. At that time he said I would make a good endodontist so I suppose I really took that advice to heart.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** So many things. Firstly, I don't think I've ever been so focused on studying one thing as I was during Prof. Facey's Ichthyology course in the summer of 2006. Four credits in four weeks is about as condensed as a course can get. It's that kind of focus that I believe prepares you for the course-load in professional school. Secondly, the research I completed under the guidance of Prof. Lippert prepared me for research in dental school. Since graduating, I've been published twice and have presented my research at national and international meetings in Boston, Las Vegas, and San Diego.

**Are there specific opportunities you think biology majors should pursue before graduation?** Absolutely take on a research project. The opportunities for research in the Biology Dept are just as varied as the interests of its faculty. I enjoyed both working in the lab for Prof. Lippert on my own research project as I did assisting in a field biology research project where we sampled for freshwater fishes (i.e. we went fishing...scientifically, of course).

**What advice would you give current Saint Michael's College students interested in graduate study and/or specifically interested in your field?** Never limit your interests at SMC. Those LSR's may seem like a pain when you're trying to study for the next organic chemistry exam, but Saint Mike's really allows you to explore so many

interesting academic fields. I discovered a therapeutic balance between the arts and sciences by majoring in both Biology and English. This is a unique luxury I believe is rarely afforded at other colleges. Specifically to dentistry, I suggest meeting with a dentist mentor to help show you what the practice of dentistry is all about. Dentists are typically very friendly and are very willing to allow aspiring students to shadow and ask questions.

**Rebecca Drapp** - class of 2006



**Current position:** Research Technician, University of North Carolina School of Medicine. Starting the DVM program at North Carolina State University's College of Veterinary Medicine in August 2013

**Background:** from Duxbury, Vermont. Graduated with B.S. Biology degree, English minor

**What got you interested in your current field?** I have always loved nature and grew up exploring in the rural areas of Vermont. As a kid, I was always heading out into the woods with my dog to explore the forest and hopefully catch a newt or frog. We had lots of domestic animals too, and I was part of a 4-H horse club. I think these early experiences and my innate fascination with the natural world made doing something in the biological sciences an easy choice.

**What led you down the path to where you are now?** After graduation, I wasn't entirely sure in what direction I wanted my career to go. I knew that I wanted to pursue a graduate degree, but I didn't want to commit to a program until I was absolutely sure that that was what I wanted to do. I got a job at the University of Vermont working as a research technician right after graduating from SMC. I worked there until I decided to move to Boston, where I got a job at the Harvard School of Public Health. It was my experiences working with research animals, combined with my previous involvement with horses that made me realize that I had always loved animals and that being a veterinarian would be an exciting and rewarding career. I researched the admission requirements, took a course to complete vet school prerequisites, and shadowed three different types of veterinarians before applying to vet schools.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** I think the undergraduate research experiences I had at SMC were immensely important in helping to advance my career. It was a random conversation that I had with Professor McCabe that led to me getting my first undergraduate research experience. I happened to mention that I was from Vermont and looking for a summer job when he said that he knew of a professor at UVM who was looking for a summer research student and knew of a funding source to pay my stipend. I got the job and the funding to do a summer research project on sea lamprey between my sophomore and junior years. The summer between my junior and senior years, Professor McCabe helped me get another grant to work with him studying potential parthenogenesis in crayfish, which led to my senior research project on mussel diversity in Lake Champlain and its tributaries.

Working with people who attended a wide variety of colleges and universities has made me really appreciate the personalized attention from and the supportive environment in the SMC Biology department. I have talked with many people who went to larger universities who have said it was hard to find undergraduate research opportunities and how they felt like they were just a number in the classroom. I think having professors who really want you to succeed and who are willing to help you get to where you want to be is invaluable.

**Do you have any advice for students interested in your field?** When looking for a job as a research technician, look for a lab that will let you learn new techniques and challenge you with your own projects. Be willing to take a job that is outside your knowledge/technique comfort zone, especially if the lab that is supportive of you and your future goals. I feel so lucky to have worked in several diverse labs. In each of these labs, I learned new techniques and gained in-depth knowledge about the different fields.

I would advise students interested in vet school to get as much veterinary and animal experience as possible, as exposure to the veterinary profession is one of the major requirements for admission. Volunteering or shadowing veterinarians that practice in different areas of veterinary medicine (small animal, large animal, public health, etc) will be essential for a competitive application.

**Are there specific opportunities you think biology majors should pursue before graduation?** I would strongly suggest doing at least a summer or semester of laboratory research. Understanding how to conduct basic science research is a valuable skill that is highly prized by many different fields. I think my undergraduate research experiences allowed me to get my first job out of college, which led to all my other experiences. Having a diversity of research experiences and being exposed to many different scientific techniques made me a stronger job and vet school candidate.

**What advice would you give current Saint Michael's College students interested in graduate study and/or specifically interested in your field?** St. Mike's has a wonderful biology department that is dedicated to helping you succeed. I think talking with the professors about your goals is a great way to find out about opportunities that you might otherwise miss. They can help you come up with a plan to strengthen your resume to make you the best candidate for whatever you want to do.

On your own, I think looking for opportunities that will make you a unique and well-rounded individual are the way to go. Taking a research technician position, even if it's not in the field that you are most interested in, is a great way to gain experience and learn new techniques. Also keep in mind that involvement in extracurricular activities, whatever they may be, can set you apart from the rest of the applicants.

**Jennifer Smith** - class of 2004



**Current position:** I have recently accepted a position as an associate mixed animal veterinarian at Pembroke Animal Hospital in Pembroke, NH after completing my Doctor of Veterinary Medicine degree at Iowa State Veterinary School. I am also a student at the University of Iowa and will receive my Master's in Public Health (MPH) in August of 2013.

**Background:** I am originally from Fryeburg, Maine. I have a B.S. in Biology with a minor in Mathematics. I will be finishing my Doctor of Veterinary Medicine (DVM) May 11th, 2013 and my Master's in Public Health (MPH) in August, 2013.

**What got you interested in your current field?** A few years after graduating from Saint Michael's College, I started working for a small animal veterinary clinic at home as a veterinary assistant. I was trained on the job as a veterinary technician and really loved working with animals and their owners. I loved my job, but I wanted to do more, and I already had most of the prerequisites from Saint Mike's, so I decided to apply to veterinary school.

**What led you down the path to where you are now?** My interest in veterinary medicine did not develop as the typical dreams and desires of a young child who loves animals. I have always had a passion for animals, but never considered a career in veterinary medicine, since, as a child, I was plagued with allergies. As an undergraduate, my biggest career goal was to help the environment and community in some way. I wanted to feel good about what I was doing. I decided to study wildlife biology, as this would give me a way to study and work with animals without having direct contact and also help the environment and community. I studied abroad in Kenya at the School for Field Studies where I learned about human/wildlife conflict and how the Kenyan people viewed animals. After my junior year, I worked for the U.S. Fish and Wildlife studying fish spawning habitat and learned of our own human/wildlife conflicts here at home. After graduation, I worked in the conservation field for a non-

profit organization. I then began to work at an equine barn part time and discovered that my animal allergies had subsided substantially.

My real interest in veterinary medicine began when I took a job at Fryeburg Veterinary Hospital as a Veterinary Assistant. The practice was in desperate need of technician help with eight doctors at the time and only four technicians in the middle of the busy summer season. I discovered that my desire to continually learn new things, help animals and people, and work in a fast paced environment were all satisfied in the veterinary profession.

I began to investigate ways to develop my career in the field and looked into becoming a certified veterinary technician. I took a few long distance education classes, but soon realized that I would be spending a lot of time and money to earn an associates degree when I already had a bachelor's degree. It was at this time that I began considering a career as a veterinarian. I realized that I could satisfy my long time career goal of helping people in need, giving back to the community and helping the environment by becoming a rural mixed animal veterinarian. I applied to a few veterinary schools and decided to attend Iowa State University starting the fall of 2009.

**What experiences in the Saint Michael's College biology department prepared you for your post-graduate training and your career?** The biology department at Saint Michael's College gave me a well rounded experience that prepared me for many different career options. I graduated with a solid understanding of the sciences, but also felt confident in my ability to communicate, both verbally and in written communications. While college is sort of about learning a specific field to accelerate it, I also feel it is more about learning basic skills that can be applied to any job market. I would not trade my experiences with the Saint Michael's biology department for anything.

**Do you have any advice for students interested in your field?** It is a highly competitive career to get into, so I recommend study hard and getting good grades for starters. However, grades are not everything; experience is just as important and a wide variety of experience looks good on your application. While a majority of my experience came from working at a small animal hospital, I also had equine, food animal, and wildlife experience to add to it. I also recommend spending some time on your essays because they are looking for someone who can communicate well, not only in written communications, but also verbally in an interview. The one thing that I would do differently, if I could, would be to try and establish residency in a state that had either an in-state option or reciprocity with an out-of-state veterinary school, because out-of-state tuition is very expensive.

**Are there specific opportunities you think biology majors should pursue before graduation?** I highly recommend taking advantage of Saint Michael's amazing study abroad program. I studied abroad with School for Field Studies in Kenya for a semester and went on the two week Costa Rica trip with the Biology department over Christmas break. Going abroad as a student gives you a much different perspective on a country than as a tourist and I would not pass it up!