

BioMass

Student Coordinator: Alex Ripperger '14

Contents

- page 1 Welcome!
- page 2 Biology Related Clubs and Activities
- page 3 Summer Research: Measles at Mayo Clinic
- page 4 The 2013-14 Student Naturalists
- page 5 Cannon River Cleanup Pictures



Dear Students,

Now that we are 5 weeks in to the 2013-14 academic year, you are probably starting to hear the words “welcome!” and “welcome back!” a little less often. We faculty and staff in the Biology Department have enjoyed seeing you in our courses, offices, and events so far this year... but please let us extend this official and genuine “welcome” to our community.

Those of you who are new to St. Olaf should know that there is a place for you in the Biology Department community, whether or not you are able to take a course in biology this year. We faculty and staff encourage you to attend our academic seminars (often on Mondays at 4:00 pm, but sometimes at different times and offered jointly with different departments like Environmental Studies and Chemistry). We encourage you to come to our office hours with questions you might have about courses, off-campus study, career exploration, or simply biology topics of interest (most faculty post their availability on their office doors). We encourage you to apply for student

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gray fox by John Giannini

work in the department, and/or to explore possible opportunities for independent study and research with us as your St. Olaf science career progresses.

Those of you who are returning to St. Olaf and to our department may know of all of the above opportunities, but it can't hurt to hear that little reminder that we are here for you in many ways! In addition, you are all returning to campus with different summer experiences behind you, and we faculty and staff will enjoy helping you build from those experiences in this academic year. We love learning from you as well, so please keep an eye and an ear out for opportunities to share your experiences with others, through things like research poster sessions and internship panels.

This BioMass newsletter is a great way to keep informed about people, events, and opportunities in and related to Biology at St. Olaf, so take a few minutes to click to it from your email inbox every month. And in between these monthly clicks, we'll see you around Regents Hall!

With best wishes from all of the Biology faculty and staff,
Jean Porterfield
Chair of the Biology Department

Biology Related Clubs and Activities

by Alex Ripperger

St. Olaf offers a plethora of biology-related clubs to help students discover the various paths one can pursue with a biology degree. Read on to learn a little more about the organizations and who to contact for more information.

Molecular Science Club also known as "StoMolS," is the St. Olaf chapter of the American Society for Biochemistry and Molecular Biology. The club offers students an opportunity to explore these fields through journal club, faculty research presentations, and other events. StoMolS meets on Mondays. Contact: Anastasia Hains <hains@stolaf.edu>

Neuro Club offers a forum for students interested in neuroscience to learn more about the field. The group discusses recent neuroscience research and scientific literature, and performs demonstrations during "Brain Awareness Week" at Northfield Middle School. The club meets Wednesday evenings from 7-8pm. Contact: Jake Westerberg <westerbe@stolaf.edu>

Tri Beta and Biology Club - Bio-Club is an informal organization that is open to any St. Olaf Student interested in Biology. It is a great opportunity to meet other students and interact with Biology faculty members. Tri Beta Biological Society is open to second semester sophomore, junior and senior biology majors. Additional requirements for membership include: 1) Minimum GPA of 3.3 within the biology major 2) Minimum of 3 completed biology courses 3) 2 completed biology club activities 4) 2 service related projects (Projects are not limited to biology, but preferred) St. Olaf's Omega Kappa chapter offers students a variety of social activities that extend beyond biological interests and promote an informal interaction between students and the biology faculty. Tri Beta is a service organization involved in community education in the natural sciences, environmental concerns and providing contacts with people holding careers in biology. Contact: Paige Owen-Kurtz <owenskur@stolaf.edu>

Pre-Vet Club aims to bring together students interested in veterinary medicine and animal health. The organization hosts speakers, plans field trips, performs community service, and holds fundraisers throughout the year. Meetings are held once a month. Contact: Alexandra Ripperger <ripperge@stolaf.edu>

Pre-Med Club is an affiliate of the new **Pre-Health Club** that works to provide support and resources for students looking to pursue a career in medicine. The club organizes volunteering events, hosts speakers, and holds a "book club." Contact: Emily Olson <olsonem@stolaf.edu>

Pre-Physical/Occupational Therapy Club is another affiliate of the Pre-Health Club that aims to help students learn more about PT/OT specialties, find shadowing opportunities, and prepare for graduate school. Contact: Tim Erickson <erickstc@stolaf.edu>

The **Holistic Medicine Club's** goal is to educate the St. Olaf community about the benefits of alternative and complementary medicine. The club hosts monthly speakers and also organizes massage and tea fundraisers. Contact: Brian Plante <plante@stolaf.edu>

Delta Delta Sigma, St. Olaf's Pre-Dental Club, helps students learn more about the field of dentistry through visiting dentistry schools, providing opportunities to shadow area dentists, and volunteering in the community. Contact: David Kirkhoff <kirkhoff@stolaf.edu>

FACE AIDS aims to harness the passion of the St. Olaf community for social change and provide students with a network to promote

Members of the Herp Club at the Co-curricular Fair.
Photo by Nick Stumo-Langer '15



global health, particularly in regards to HIV/AIDS. The club works with HIV/AIDS infected youths in impoverished communities. Contact: Brian Thoes <thoes@stolaf.edu>

Herpetology Club is a group of students who are passionate about reptiles, amphibians, and birds. Members care for the terrariums in the atrium on the fourth floor on Regents Hall and take field trips to bird-watch. Contact: Cody Ewers <ewers@stolaf.edu>

Oles for Global Health is a group that aims to raise funds and awareness for global health concerns. The club is interested in learning about sustainability in global health and the full spectrum of what "health" entails. Contact: Brian Adams <adams@stolaf.edu>

All information was taken from the organizations' pages on the St. Olaf website.

Summer Research: Measles at Mayo Clinic

by Kyle Gibbs '14

This summer I worked in Dr. Roberto Cattaneo's virology and gene therapy lab at Mayo Clinic under the guidance of Dr. Chanakha Navaratnarajah. The lab focuses on the measles virus, an enveloped negative-strand RNA virus of the family *Paramyxoviridae*, which still affects millions worldwide despite the presence of an effective vaccine. Because wild-type measles exists in only one serotype (variation of a virus based on surface antigens), the vaccine is effective, and elimination is a public health and policy concern. However, the versatile size, simple genome, and cytoplasmic targeting of measles also make it ideal as a vector for oncolytic gene therapy, the lab's interest.

Looming issues in gene therapy include how to shield and target vectors. Measles-based vectors require shielding due to prevalent preexisting immunity from the vaccine. Two glycoproteins, the attachment protein, hemagglutinin (H), and the fusion protein (F), which mediate measles virus pH

neutral cell entry, are the key players in both questions. Receptor binding to the H head triggers conformational change, which transmits a signal via the H tetramers' stalk, to the F trimers, causing membrane fusion. Currently, only the head region of the H protein has been successfully crystallized for amino acid level structural analysis.

Using this limited knowledge, we attempted to create chimeric attachment proteins composed of the stalk of measles' H and the heads of closely related *Morbillivirus*, canine distemper, and the more distantly related *Henipavirus*, nipah virus. We assessed chimeras for expression and oligomerization with immunoblots, measured surface expression by FACS (fluorescence-activated cell sorting), and assessed fusion function with a Vero cell line cell-to-cell fusion assay. Only chimeric clones built with longer measles stalks expressed and oligomerized. The summer only allowed time to test the canine

distemper chimeras, which did sustained fusion with the measles F-protein. Beyond providing a novel vector, this suggests a conserved fusion mechanism across *Paramyxoviridae*.

Previous research constructed measles vectors built with envelopes entirely swapped with canine distemper. Hopefully, these chimeric constructs provide groundwork for several different iterations of canine and nipah-based measles vectors. Such diversity provides the serotype variability for the multiple treatments required in effective oncolysis. Further elucidation of the triggering mechanism may also lead to rationally designed antivirals. Both are good results for the patient.



The 2013-14 Student Naturalists



Nora Flynn - I am a junior majoring in biology and I am especially interested in biotechnology. While studying abroad in New Zealand in the spring of 2013, I had the opportunity to take a plant biotechnology class that has piqued my interest in the methods used to affect plant growth and development. Having grown up in Northfield, Minnesota, the St. Olaf Natural Lands and Carleton Arboretum were my playground, a space for make-believe adventures and exploring from a very early age. Now the Natural Lands have become a place for quiet refuge and environmental learning. I spend my summers leading wilderness trips in the Boundary Waters Canoe Area of Northern Minnesota and Quetico in Canada for Camp Widjiwagan. It is a fantastic way to foster a relationship between young people and their environment. I strongly believe that any motivation to preserve the environment stems from personal experiences and connections to natural places. As a student naturalist, I hope to enable these kinds of relationships between the St. Olaf and Northfield communities and our Natural Lands.

Sonja Helgeson - My passion for the outdoors began as a child climbing along the rocky shores of Lake Superior in the far northeast corner of our state. I grew up in a northwest suburb of Minneapolis and came to St. Olaf intending to be a physics major. That only lasted a week when I realized I was in love with my introduction to environmental studies class. Now as a junior biology and

environmental studies double major, I couldn't be more excited to share my knowledge of the Natural Lands with the St. Olaf and Northfield communities. I've come to know and appreciate its prairies, forests, and wetlands more intimately through biology and environmental studies classes, summer research with Professor Shea, by attending student naturalist events, and through my own explorations of the lands as a refuge from the busyness of college life. The Natural Lands are critical as a reminder of Minnesota's natural heritage and as a safe-haven for native species as more land is converted to urban and agricultural uses. After St. Olaf I aspire to pursue a career in conservation biology with a focus on ornithology.

Hannah Marti - I am a senior biology major with a passion for ecology and evolutionary biology research. I am especially interested in the evolution of social organization in ant colonies as a way to understand different forms of intelligence and evolutionary success. As I've grown into my interest in biological sciences at St. Olaf, I have also strongly felt the value of connections between people and the natural world, and connections among people in natural spaces. Having the Natural Lands as a wild place in St. Olaf's backyard is a wonderful way to foster these connections and to increase awareness about the environmental issues our generation faces. I am proud to be able to study, restore and share the Natural Lands this year as a student

naturalist.

Kate Seybold - I am a junior biology and environmental studies double major. Though my greatest interest lies in sustainable food production and local food systems, I believe we all have a responsibility to be stewards for our planet and our home in every way possible. Growing up in North Central Wisconsin, I was raised with a respect and admiration for Mother Nature. I can remember family camping trips on Lake Superior, long walks with my forester-grandpa, cross-country ski trips out East, and many summer nights spent under the stars at Camp Wise Spirits. I grew up appreciating the environment around me, thanking the Earth for what it generously provides us. Looking back, it seems natural that I pursued environmental studies and biology in college, but back then I simply followed the path of what intrigued and impassioned me, what seemed most meaningful and critical for our future. Since arriving at St. Olaf, my love for the outdoors has swelled to an even deeper appreciation and fascination for the natural world around us. With that said, I am thrilled to be a student naturalist! I look forward to sharing my passion for the beautiful environment surrounding our campus, passing on my knowledge of biology and environmental science, learning from my peers,

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Nora



Sonja



Hannah



Kate



Ellen



and fostering a strong community around sustainability and environmental awareness.

Ellen Squires - I am a senior from Andover, MN majoring in biology and environmental studies. My love affair with the outdoors started early, when I was a young kid catching and studying bees on my dad's sedum plants. After a childhood filled with hiking, biking, and family camping trips, my early interest in nature has developed into a full-blown obsession. I still enjoy the outdoors recreationally, through running, bird watching, and kayaking, but I also enjoy studying it in an academic context. The experiences I've had at St. Olaf as a biology and environmental science major, from bird banding at Weaver Dunes to a semester abroad in Australia, have only cemented my desire to protect the natural environment that I love. I am immensely grateful for the St. Olaf Natural Lands, and I have taken every opportunity I can to enjoy them during my first three years as an Ole. Whether it's watching mallards cruise around Bakko Pond or taking in a summer sunset amidst the blooming prairie grasses, the Natural Lands are full of beauty and ecological complexity, and I'm excited to share them with the student body and the Northfield community.

5th Annual Cleanup for the Cannon River Watershed September 21, 2013

Around 50 students joined Professor Kathy Shea, The Cannon River Watershed Partnership and other community volunteers to pick-

up debris along a stretch of the Cannon River. It was a beautiful day. Check out the St. Olaf Naturalists Facebook page - <https://www.facebook.com/pages/St-Olaf-Student-Naturalists/367169469974379>.

