



BIOLOG

FALL 2015 | VOLUME 6 | ISSUE 1

PROFILES OF UNDERGRADS DOING RESEARCH



HOUDA ABDELRAHMAN

What made you choose the Department of Biological Sciences? When I visited NDSU as a high school senior and compared different major curriculums, I saw how the Dept. of Biological Sciences strongly prepared students with diverse biology interests to reach their career goals. Majoring in Zoology as a pre-medicine student allowed me to take all the required pre-requisite courses, complete two minors, perform undergraduate research, and take challenging, interesting classes for medical school in a variety of departments--all in four years without burden due to schedule conflicts. As a pre-medicine student, the ability to transform a basic biology class schedule into a unique reflection of interests and professional goals is empowering.

What activities have you been involved in? Undergraduate research, College of Science and Mathematics student ambassador and freshmen

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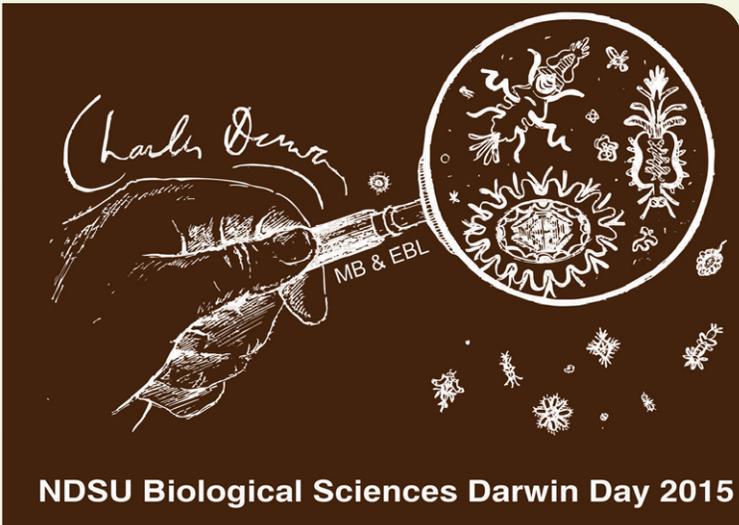
NICOLE SNYDER

What made you choose the Department of Biological Sciences? People in the department seemed extremely friendly, making it easy to get to know my professors. The department also offered multiple opportunities to get involved in undergraduate research, which I felt was invaluable to a science degree.

What activities have you been involved in? The great thing about this campus and especially this department, is there are so many opportunities! The past four years I have actively participated in avian research in the Reed/Clark Lab and enjoyed every minute of chasing around Franklin's Gulls and Red Winged Blackbirds for samples. Through research I was able to travel to a conference in San Francisco and present our lab's findings. I've also had the amazing opportunity to be an undergraduate Learning Assistant, where I was able to apply student-oriented teaching methods hands-on and improve courses I had already

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DARWIN DAY 2015

Highlights from Darwin Day 2015: **1.** Ned Dochtermann presents a Darwin Day lecture at the Fargo library **2.** Skull replica of a Siberian tiger **3.** Question and answers at the library **4.** Dr. Jessie Rock of Geology showing horse evolution to curious future scientists **5.** Dr. Tackett, the guest speaker for Darwin Day **6.** Dean Wood laying down some evolutionary tunes **7.** Rapt attention being given to Darwin Day speaker **8.** Bio graduate student showing off well-adapted northern at Hall of Biodiversity. 🍃



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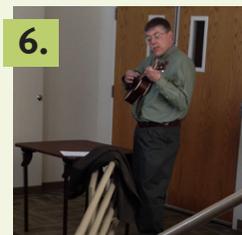
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In Fall 2014, NDSU partnered with the Red River Zoo to create the NDSU Conservation Research Facility. Despite the official name, it is known to most people as “the Baviary”, which was the original name given to the project by Dr. Wendy Reed, since the facility was designed to house birds and bats.

The Baviary is an excellent example of the power of alumni financial donations for promoting the mission of the department. The facility could not have been built without a generous donation from Kirsten and Donn Diederich which was combined with support from a National Science Foundation Grant # HRD-0811239 to the NDSU Advance FORWARD program. As a result of this support the DBS has been able to develop a mutually beneficial collaborative effort with the Red River Zoo that increases the accessibility of science to the public and provides crucial infrastructure for animal research.

Currently, three research groups from the Department of Biological Sciences at NDSU are using the zoo facility. Emily Stewart, a M.Sc. student working with Dr. Tim Greives, conducted her research on the social behavior of Black-Capped Chickadees (*Poecile atricapillus*) at the Baviary. Emily’s research focused specifically on how the social structure of chickadees impacts their health and fitness. Living in North Dakota year round, black-capped chickadees spend the winter months living in small social flocks in which a clear dominance hierarchy is established. The goal of Emily’s study was to determine if a relationship exists between an individual’s dominance rank in the winter flock and his or her ability to mount an immune response against a pathogen. To address this research question, Emily brought 36 wild birds into the zoo facility and divided them into flocks of four individuals. She used video recordings at the bird’s feeder to assess the dominance hierarchy within the flock. To assess immune function, Emily took blood samples from each bird at the beginning, middle, and end of the study and conducted a variety of immunological assays on the blood samples.



RESEARCH AT THE NDSU CONSERVATION RESEARCH FACILITY (A.K.A. THE BAVIARY)

As a second study, Emily tested how infection/sickness impacted an individual’s rank within the hierarchy. She tested this by exposing animals to an agent that produces symptoms of infection without actually introducing a pathogen. Interestingly, Emily found that injected birds did not change dominance rank, suggesting that dominance hierarchies in social flocks are stable and not affected by temporary immune challenges or sickness.

The NDSU Conservation Research Facility is also being used by the Reed lab for research. Lucas Wandrie, a Ph.D. student under Dr. Reed, is currently using a

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captive population of red-winged blackbirds, *Agelaius phoeniceus*, and European starlings, *Sturnus vulgaris*, to map how levels of corticosterone change across the year. Corticosterone is a hormone that is part of the stress response in birds; Lucas' work provides insight into seasonal changes in stress patterns of these two species. Lucas is also using the birds to study their response to Unmanned Aerial Systems (i.e., drones). While this may seem like an odd combination, drones are currently being explored as a tool to mitigate crop damage. Both red-winged blackbirds and European starlings cause millions of dollars in damage to sunflower crops. If the birds exhibit anti-predator responses to the drones, such as leaving the immediate area, drones may be an effective part of an integrated pest management plan for reducing bird damage to crops.



Finally, the Gillam lab has also been using the Baviary to study the ecology and behavior of big brown bats, *Eptesicus fuscus*. In collaboration with Dr. Mandy Guinn at United Tribes Technical College, Dr. Gillam hosted two undergraduate students during Summer 2015 to conduct research on a colony of male big brown bats housed at the Baviary. This research focused on two aspects: social behavior and foraging ecology. The "bat houses" in which the bats roost during the day, have cameras installed within them, which allows for continuous video monitoring of the animals. JP Picotte, an undergraduate at UTTC, worked with this video data during the summer to develop a basic ethogram of the behaviors of male big brown bats. An ethogram is a catalog of behaviors that are exhibited by a given species. Very little is known about social behavior of bats within the roost, so such basic characterizations of social behavior are needed. Nick Johnson, an undergraduate at NDSU, is continuing with this behavioral work by asking questions about competitive behavior in big brown bats. Nick is conducting behavioral trials to assess

the competitiveness/dominance of each bat within the colony. He is also assessing the position of the bats within the huddle (during the day, bats generally roost together in one large group) to see if bats that scored high in the competitive trials also achieve the most desired spots within the huddle.



Tony Walking, an undergraduate at UTTC (now NDSU), also worked with the bat colony at the Baviary this summer. Tony's research focused on understanding if bats that are given a choice of food types preferentially eat the best, most energetically profitable, food. This study tested optimal foraging theory, which predicts that when the highest quality food is available, animals should only eat that food type; they should only switch to include lower quality food in their diet when the highest quality food is rare and hard to find.

Overall, the Baviary has been a major asset to the Department of Biological Sciences at NDSU. Other researchers within the department plan to use the facility for upcoming research, so we will certainly have more exciting projects to report on in the future out at the Red River Zoo! 

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CLAMBEY SCHOLARSHIP

The Gary K. Clambey Biology Scholarship was established in 2001 to provide financial assistance to a junior or senior biology major at NDSU. The award was established anonymously as a tribute to an award winning educator in the Department of Biological Sciences.

At the time of the first scholarship donation the original donors were unknown. However, as of 2015 when Dr. Clambey announced his upcoming retirement it was made public that the donors were past graduates of the biology program at NDSU, George and Lori Linz. George graduated with a degree in wildlife biology emphasis and went on to work for the USDA pest control division as well as interact with faculty and graduate students working on “the blackbird project” at NDSU. Lori went on to medical school, received her MD and is now a pathologist.

The scholarship has now been awarded to fourteen deserving students over the past fourteen years. The conditions of the scholarship mandated that the award would be given to a biology major in the department based on recommendations from Dr. Clambey. No application was necessary. Dr. Clambey said that he evaluated students based on their GPA, their long-term plans after college and their contribution to the department. Recipients chosen had demonstrated academic excellence, extracurricular commitments to the department and long term interests in the biological sciences. The list of recipients includes an array of impressive graduates including: doctors, track and field athletes, wildlife biologists, science teachers and conservation specialists. The award is based on the interest income from the initial award offered to the development fund. Dr. Clambey began making financial contributions to the fund a couple years ago and plans on continuing to do so in the future after he retires. *✍*

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WHERE ARE THEY NOW?

Get to know our alumni and see how their degrees in Biological Sciences have prepared them for their careers.



**NICOLE
COLLINS, O.D.**

Nicole Collins, O.D. is an optometrist with Begstrom Eye and Laser Clinic in Fargo, ND. She provides primary eye care with a focus on ocular disease and post operative management care of patients. Nicole graduated from NDSU in 2008 with a degree in Zoology and a minor in chemistry. After graduating from NDSU, Nicole went on to receive a doctorate from Pennsylvania College of Optometry at Salus University.

How did you come about choosing this degree?

My academic advisor and I sat down and discussed the profession I was looking into and what degree would line up best with not only the prerequisites needed for optometry school but my interests as well.

What made you choose NDSU for your degree?

It is a well-known school with a great academic program.

How did your degree (or the Dept. of Biology Sciences) help prepare you for your career?

My degree at NDSU prepared me for my career by giving me the knowledge I needed to succeed at optometry school. I felt I was more academically prepared than some of my colleagues.

What was your favorite memory of the Dept. of Biological Sciences? One of my favorite memories at NDSU was going on a field trip for ichthyology. We went to a local stream and used a seine net to catch fish and then identified them.

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**KYRA
DAUGHERTY**

Kyra Daugherty is a 2013 graduate from NDSU with a degree in zoology and minors in chemistry and psychology. She is currently attending Northwestern Health Sciences University in Bloomington, MN, and is working towards receiving her Doctorate in Chiropractic.

What other jobs have you had since graduating from NDSU?

As soon as I graduated from NDSU I had the opportunity to travel aboard for a month and a half. I was able to see some incredible things and meet countless amazing people. Once back I took the summer to work as a bartender to save money for school in the fall.

How did you come about choosing your major? When I started at NDSU I knew I was going to be continuing on and attending some Chiropractic college. The advisors at NDSU recommend zoology for me, with the pre Chiro option.

What made you choose NDSU for your degree? My Dad attended NDSU and also grew up in Fargo so it was always his DREAM for my siblings and I to attend NDSU. When I say dream I'm not kidding its all he ever talked about for us! At first I was super against it but as soon as I toured the campus and met other students it changed my mind. I knew NDSU was for me.

How did your degree (or the Dept. of Biological Sciences) help prepare you for your career? Attending NDSU prepared me for the course that I now am currently taking in my program. It was a relief to know that what I learned at NDSU was going to be paying off.

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Kyra Daugherty
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What was your favorite memory of the Dept. of Biological Sciences?

My favorite Memory of the dept. of Biological Sciences would have to be, seeing all my friends struggle in the morning to make it to 8 a.m. class in Stevens Hall. I even had my days where going to those classes was the worst but being able to see all your friends in the morning and chat is so nice and once leaving school you realize how much you miss those times of just being able to see your friends throughout the day and chat between class.

If you could give one piece of advice to incoming students concerning their studies or their career, what would it be? Don't be afraid to ask questions, or talk to your teachers. They are there to help you and they once where in your shoes. I might have seemed like a brown-noser to some students but seriously getting to know your teachers is pretty fun! They have some of the funniest stories out there. They also give good advice if you are in a pickle. The connections you make in college will impact your life in some way or another too. So step out of your comfort zone and talk to everyone and anyone!

What was your favorite class in the Dept. of Biological Sciences? My favorite class at NDSU had to be Bio Chemistry taught by Erika Offerdahl. It was for sure

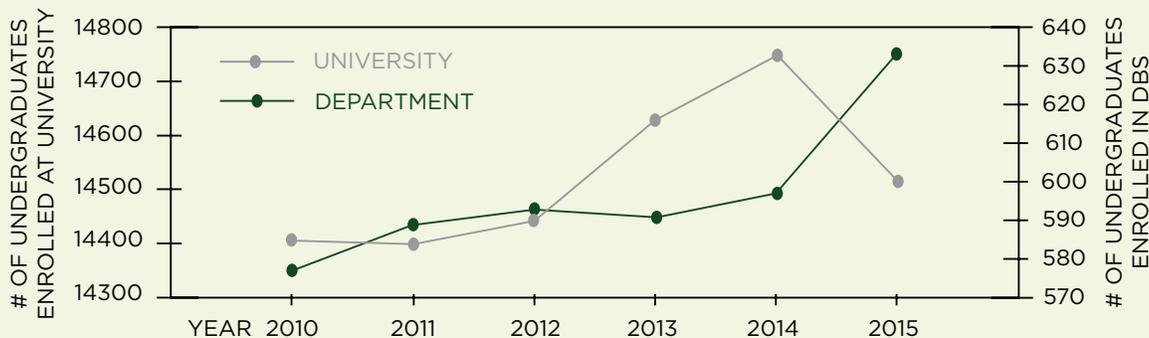
a challenging course but it made me think and the additional help, which was offered in the course, was awesome. She was always willing to help no matter how silly the question seemed. She also never made you feel dumb for asking, and If you still didn't get what was going on after her explanation she would try again until she found what would work for you. Having teachers around who are this helpful and thoughtful made all the difference in the world for me. Katie Reindahl also taught her courses like this and between the two of them they really made my college experience unforgettable.

Did you do any undergraduate research while you were here? If so, please describe it: I did not, however if I could go back I would. Getting that kind of hands on experience could have been really helpful.

What is one class you never took but in hindsight wish you would have? I wish I would of taken both Anatomy courses. They where not required for starting out in Chiro school So I only took one instead of both and really looking back at it I should of pushed myself and done both.

Any other thoughts? Enjoy your time at NDSU It may seem like class drags on or the year never ends, or finals are going to kill you but all your doing is wishing your time away, so instead of that Enjoy it, take it all in and have fun. Also attend the football games! You will be sorry if you don't! Most of all good luck with all you have a head of you and never forget you aren't alone you are part of the HERD!!!!

ENROLLMENT AT A GLANCE



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Nicole Snyder
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taken. Another great aspect of this department is its outreach programs to NDSU and Fargo community. I've participated in Darwin Day events and helped sixth graders discover the thrill of science with a termite experiment (if you're interested in the experiment, I advise taking animal behavior!). Other extracurricular activities I have been involved include volunteering with NDSU Campus Lions Club and playing on the NDSU Women's Club Rugby team.

What do you see as the department's greatest strength?

The department's greatest strength has been its integrative collaboration. It's fantastic to see labs sharing ideas, brainstorming together, really working as a supportive community. The community invites you

in, helps you develop as a researcher and student, and provides you with a plethora of opportunities to work closely with many of your professors, not just your lab adviser. I've also appreciated that the members of the department value all levels of students equally, i.e. ideas from undergraduates are valued just as much as graduate students and professors. Everyone in the department is here because they love what they do and they love to learn. It's a great environment in which to work and study.

What are your plans after graduation?

Short term plans include continuing my undergraduate research as a Zoology Master's student at NDSU. Long term plans include continuing my education and attain a PhD studying avian reproductive endocrinology. Someday I hope to become a professor at a university and "pay it forward" by providing equally exciting opportunities to fledging undergraduates. ✍



Nicole Collins, O.D.
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If you could give one piece of advice to incoming students concerning their studies or their career,

what would it be? I would recommend job shadowing in the field or fields they are interested in.

What was your favorite class in the Dept. of Biological Sciences? My favorite class in the Dept. of Biological Sciences was Microbiology.

What is one class you never took but in hindsight wish you would have? I wish I would have taken the upper level courses of Microbiology only for the fact that I really enjoyed the 101 class. ✍



Houda Abdelrahman
Continued from pg. 1

mentor, Pre-Medicine Association, NDSU Spectrum student newspaper, NDSU Northern Eclecta, community volunteering.

What do you see as the department's greatest strength?

Developing strong relationships with scientists and instructors is very important for pre-medicine students, both in the classroom and in research labs. The Dept. of Biological Sciences is rapidly growing in research, and faculty welcome students into their labs as early as freshman year. This creates opportunities for students to grow in hypothesis-driven research projects. The faculty are excellent at balancing research, teaching, and advising. The learning atmosphere in the classrooms is both welcoming and challenging. The dedicated faculty truly are role models.

What are your plans after graduation?

University of North Dakota School of Medicine ✍

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DEVELOPMENT FOUNDATION FUNDS FOR THE DEPARTMENT

J. Frank Cassel Zoology Fund for Scholarship & Research
Gary K. Clambey Scholarship Fund
Cross Ranch Fellowship
Sheila Kath Scholarship Fund
Dr. G. Arthur Larson Memorial Fund
Oliver Lavoy Memorial Scholarship
Linz Family Endowed Ornithology Scholarship Fund
John B. Ries & Frank Startz Families Scholarship
Dr. Velva E. Rudd Scholarship Fund
Dr. A.D. Stoesz Memorial Scholarship



HOW TO GIVE TO THE DEPARTMENT OF BIOLOGICAL SCIENCES:

- 📄 Online: www.ndsufoundation.com and click on “Give now”
- 📄 By mail: NDSU Development Foundation, PO Box 5144, Fargo, ND 58105 (please make checks to NDSU Development Foundation)
- 📄 Call: 701-231-6844

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