

SCOOOP

DNAS
SCIENTIFIC

Greetings Science Friends!

I hope that this message finds you, your family, and your friends well.

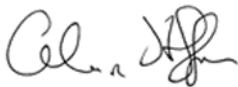
Teaching and researching during this global pandemic has been, for lack of a better term, interesting. Inside this newsletter you'll read about the many ways that our Department of Natural and Applied Sciences faculty, staff, and students have gone above and beyond this past semester.

This semester our departmental mantra has been - **Care To Connect**. Oodles of research show that personal connections are important to physical and mental well-being. The global pandemic has made connecting harder, but paradoxically, even more important. During an end-of-semester exit interview a first year science student commented on how this semester went, "There were some challenges, but overall my semester has gone well; I get to physically attend class, I know my professors, and I'm learning lots."

I loved all the responses after our inaugural newsletter last spring. Please continue connecting and feel free to contact me - ahoffman@dbq.edu - with any questions, comments, or just to say hello.

Lastly, thanks to all the students - past, present, and future - you are the reason we do what we do!

Yours in science,



Adam R Hoffman

Professor of Environmental
Chemistry
DNAS Department Head



Scan to hear more from Adam



What's Inside

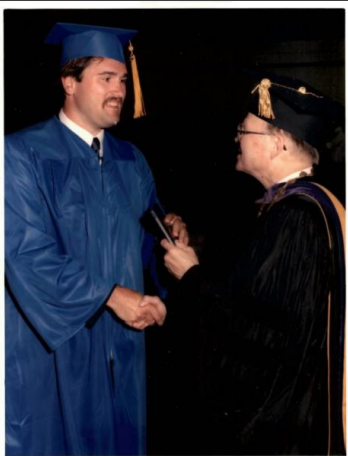
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Teaching Spotlight

My Retrospective



Rich Smith
Assistant Professor of
Physics



University of Dubuque
Commencement
May 9, 1987

I have been associated with UD since 1982, first as a student and first-generation graduate (1982-1987). Things were so different then. Blades Hall was the newest building on campus. Total enrollment was about 800, the Science Building was much smaller and the whole block between the library and the football field were houses! Walkmans, cassette players, vinyl records and radios were how we listened to music!

I returned to UD in 1996 as a math tutor and media specialist! While math hasn't changed much, media certainly has. Back then, professors used 16mm projectors, slide projectors, cassette players and VCR players! I continued my career at UD as an adjunct in the Science/Math and Aviation departments teaching mathematics and physics.

In 2000, I became a full-time instructor for physics/mathematics. I brought Calculus I back to campus due to student demand. I developed the Pre-Cal course, taught Physics I and II and continued to teach math. In the last 5 years, the demand has grown for physics, so I no longer teach math courses. I miss it, as math was always fun for me. But physics is even more fun.

Campus has changed dramatically since 2000 with increased enrollment, new majors, facilities and opportunities. When the new science center was built, I had the honor of helping design the classroom I now use every day.

With COVID this year, it's been a real challenge to teach in this new environment. From the technology needed and the amount of computer time I spent trying to teach, I felt that I was working twice as hard, but with half the effectiveness. I have strived to adapt to hybrid teaching. My skills with Teams, Zoom and Outlook have improved. It's even forced me to learn some html code so that I can create my own online exams in WebAssign.

I sure miss the normal interactions with students in lab. For the students attending remotely, it's harder to explain experiments without students doing the experiment, collecting data, and receiving personalized instruction in the classroom.

I'm really looking forward to a more normal 2021 – 2022 academic year.

"Dr. Smith is always ecstatic to teach all students. He is one of the most passionate and caring professors. He is dedicated to helping the students strive for success, and always willing to help. The passion and energy he brings to class every day is unbelievable. As a student, I couldn't be more grateful to have him in class helping me learn." - Brady McIntyre (C'23)

Research Spotlight

Understanding Light Sources in a Photochemical Reaction



Amandeep Arora
Assistant Professor

In nature, light triggers a number of chemical and biological chemical reactions. In photosynthesis, plants use light to convert carbon dioxide into glucose and oxygen. In the human body, light is used to synthesize vitamin D in the skin. These are only a few examples of biological and chemical reactions that depend on light. In any photochemical reaction, light is used as a reagent. The evaluation of light sources in terms of knowledge of the photon flux and light intensity are important factors in designing any photochemical experiment. These key data provide the required information to optimize and reproduce the reaction in different photoreactors.

So, over the summer, we started working on outlining an undergraduate lab activity to find the photon flux on chosen blue LEDs using a homemade photochemical setup. Ultimately, we can use physical and analytical concepts to determine the quantum yield of photochemical isomerization reaction.

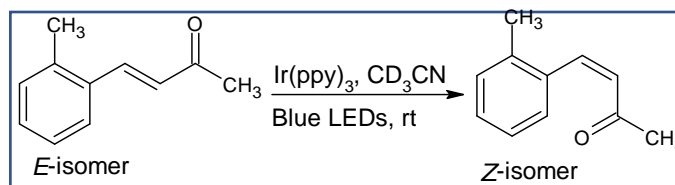
The chemical actinometry lab experiments are a very standard method to calculate the photon flux and quantum yield of a photochemical reaction using Beer-Lambert equation

$$I_0 = -\frac{d[Act]}{dt} \left(\frac{1}{\phi} \right) \left(\frac{1}{1 - 10^{-\epsilon b [Act]}} \right)$$

We designed a photochemical setup:



The compound 2,4-dinitrobenzaldehyde is used as an actinometer with known quantum efficiency. The photoisomerization of trans-allylic amine under visible light was studied (as shown below). A change in concentration of reactant vs. time was recorded for the first 4 hours after every 15 minutes. Data obtained from this step of experiment were used in calculating the quantum efficiency of the reaction. We are very excited with the results, we obtained a quantum efficiency of 0.02, and look forward to publishing them soon.



Faculty Spotlight



Grant



Adam Kleinschmit
Associate Professor of
Biology



3rd NIBLSE Conference
Omaha, NE Oct 2019

Adam was recently tapped to join The Network for Integrating Bioinformatics into Life Sciences Education (NIBLSE; pronounced "nibbles") Leadership Team and formally become a co-principal investigator as part of a National Science Foundation (NSF) funded grant. NIBLSE is a research coordination network for undergraduate biology education (RCN-UBE). RCN-UBE grants are awarded to catalyze positive changes in biology undergraduate education by leveraging the power of a collaborative network on the national stage. The long-term goal of NIBLSE is to promote comprehensive integration of bioinformatics into undergraduate life sciences education. To that end, NIBLSE drew from the collective expertise of the Leadership Team and Steering Committee and worked from the literature to collaboratively identify, vet, and refine a set of bioinformatics core competencies that are essential to undergraduate life sciences education. A secondary goal is to identify and vet assessment tools that align with the core competencies and will facilitate educational research related to integrating bioinformatics into the life sciences. Furthermore, NIBLSE aims to organize and simplify the dissemination of curricular materials, assessment tools, and professional development resources that align with the core competencies.

Leading up to formally becoming a co-principal investigator as part of the grant, Adam has served as a member of the NIBLSE assessment validation committee, expert user for a learning resource incubator, a mentor as part of a series of faculty mentoring network professional development communities and presented on behalf of NIBLSE at national conferences over the past three years. Adam is currently the chair of the NIBLSE assessment validation committee and is presently working on three NIBLSE-associated manuscripts. Adam is the primary author for a submitted research paper, which outlines a structured process to facilitate integration of bioinformatics principals across diverse life science classrooms, supported by assessment data. Adam is also a co-author of a submitted meeting report-style manuscript focused on the sustainability of NIBLSE and of a perspectives-style NIBLSE manuscript in preparation, which focuses on developing assessment instruments for emerging, interdisciplinary fields.

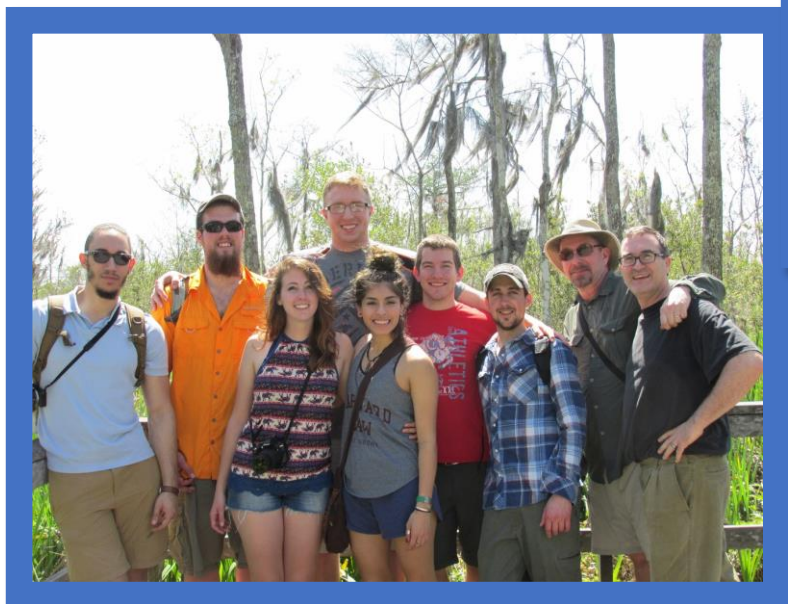
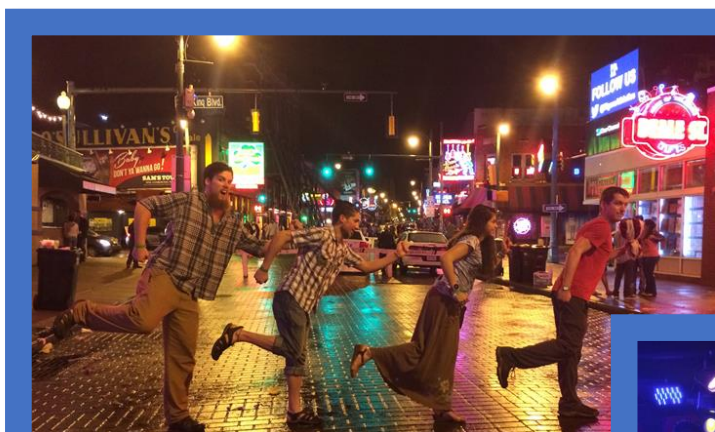
Adam is currently integrating bioinformatics competencies within UD undergraduate courses including Cell Biology and Microbiology, while working to develop a Genomics and Bioinformatics special topics course.

The NSF award #1539900 entitled "Network for Integrating Bioinformatics into Life Sciences Education (NIBLSE)" was awarded to the lead principal investigator William Tapprich, University of Nebraska at Omaha.

From The Vault

New Orleans 2016: *Geology and Jazz*

Since 2008, Dale Easley and Jim Sherry have taken students to New Orleans for *Geology and Jazz*, a spring-break trip that includes swamps and marshes, brass bands and zydeco, museums, a riverboat ride, and walks through the historical city. They always stay in the India House Hostel, a half-block off the streetcar line that leads by the French Quarter to the Mississippi River. Going and coming, they stop in Memphis, visiting the National Civil Rights Museum and Beale Street. Who says learning can't be fun? *Laissez les bon temps rouler!*



Left to Right:

- A hike in the swamp at the **Jean Lafitte National Historical Park and Preserve**. L to R: John Sterling (C'19), Tony Vorwald (C'16), Melissa Wagner (C'15), Spencer Bronson (C'17), Fabiola Ortiz (C'17), Wade Gibson (C'16), Jake Theis (C'16), Dale Easley, and Jim Sherry
- Tony, Jake, Fabiola and Wade, on **Beale Street, Memphis**, a stop going and coming between Dubuque and New Orleans.
- Out and about listening to music, including **Kermit Ruffins at the Blue Nile**.
- As usual, ignoring instructions to put away their cell phones.

In The Lab



Emily Gross (C'24): Working in chemistry lab making polymers.



Natalie Dienstbach (C'21): Grinding bovine teeth as part of Butler Fellowship Project investigating protein analysis in teeth.

Congratulations DNAS December Graduates



Nathan Ferguson

- Currently I am working towards my Master of Divinity with UDTS. I am doing this while serving two small churches here in Iowa.
- I will miss the community. I was able to connect with other students and teachers in a way that really made my education fun, and impactful.
- I think that my favorite memories came from our field work for our classes. Some of that field work was during water testing, Botany, Ecology, and others. I enjoyed the work that was done with classmates as well as the hands-on learning experience.



Matthew Klaes

- I plan on becoming a Conservation Officer in Wisconsin. I have been hired as a summer water patrol officer in Iowa.
- The thing that I will miss the most about UD is definitely the opportunity I received with the bass fishing team. Over the past four years I was able to travel across the country to many different states in order to participate in collegiate bass fishing competitions. None of that would have been possible without funding from the University, and those trips gave me experiences that I will never forget. I will also miss the great professors here in the science department at UD. They have helped me a lot over the past four years, including advising me on my career goals and just being great knowledgeable teachers.
- My most significant memory at UD is more of a collection of memories from my classes here - from taking water samples with Dr. Hoffman, to learning about wildlife conservation with Dr. Zuercher, to learning how to do environmental site assessments with Dr. Easley. These memories will be vital to my success, and they will also help me in the future in my career.



Tiffany Limmox

- I plan to attend a Physician Assistant program.
- The thing I will miss most about UD are the connections I have built with my professors and my peers.
- One memory I have of UD was when my classmates and I got together to study for an organic chemistry exam. We took the time to schedule our own study group and I was happy to see how we all worked together to review the material together.



Hannah Selfridge

- I am working on figuring out exactly what I'd like to do and applying to grad school while looking for a job in my field.
- I will miss all the amazing people as well as professors that I have met during my time here.
- A favorite memory is sitting in Dr. Z's evolution class my freshman year and hearing about the *Aegla* crab project for the first time. It was the beginning of an amazing project that I hope to see completed.



Reegan Sturgeon

- I plan to stay in Dubuque and finish my research and be a Teaching Assistant. Next, I plan to go to graduate school to get my PhD so I can teach at a college.
- I will miss all my professors and all the interesting classes and opportunities to learn new things. I have always liked learning, and the ability to focus on things I enjoyed was what I really loved.
- My favorite memories are from going out in the summer to do research with Dr. G and Megan for the Chlapaty Fellowship program. I loved the opportunity to learn field research. Also, the fun conversation we had on the rides to and from the sites are unforgettable. I also found my cat during these trips.

Congratulations DNAS Alumni

December PA Graduates



Connor Golden
BS Biology (C'17)
MS Physician Assistant Studies

I have accepted a position at Medical Associates in Dubuque to work as a Physician Assistant in their Neurology Department. I am greatly looking forward to starting in Spring 2021.

I have had a lot of great memories at UD. One of my favorites was when I was able to attend the Alumni Dinner as a student representative of the PA program. First, I thought it was a cool idea to have current students sit down with Alumni and hear their stories. Secondly, I was honored to be in a room with such great and successful people celebrating our education at this University. Lastly, it was great to feel like I was welcomed into the greater UD community.



Katie Silberstein
BS Biology (C'18)
MS Physician Assistant Studies

My post-graduation plans are to find employment! I am focusing on finding jobs in either emergency medicine, urgent care, or surgery but am always keeping my sights out for other job specialties as well. I am excited to begin my career as a PA and to settle down for a while. There will be many new changes over the next year including employment, finding a new home, and hopefully getting a pet!

One of the most memorable parts of being involved in DNAS was the undergraduate research and Chlapaty Fellowship that I was able to participate in. My favorite research memories involved working with *C. elegans* and sharing my work with other research, trapping turtles, and catching mice with the other fellows.

Past



Alec Rutherford (C'18)

Tell us a bit About yourself. My name is Alec Rutherford and I am a 2018 graduate from the DNAS. Since graduating with my degree in Environmental Science, I have been working as a seasonal wildlife biologist throughout the US. I have been able to work with flying squirrels and other small mammals, wolves, black bears, bobcats, white tailed deer, and elk throughout places such as Oregon, Michigan's UP, New Mexico, and Arizona.

What are your goals? To get into a graduate program for wildlife biology and conservation.

Why UD? How much of a community the DNAS is. One of the many perks of smaller schools, in my opinion, is that you get to create personal relationships with each professor. Helping out with the fieldwork some of the professors are doing would be the best thing to do if you want to go the wildlife research route.

How has education shaped the person you are? It helped show me how privileged I have been throughout my life. Despite growing up in a very open family, being a white male in a predominantly white school system hid a lot of truths about educational opportunities for underrepresented and disadvantaged groups of people. I was never one for caring much about education, but going to UD and being welcomed by people of various races/ethnicities, religions, and sexual orientations gave me a chance to understand how privileged I have been. It propelled me to want to share what I've learned with people of all ages.

What is one book you would recommend everyone read and what has been your favorite quarantine hobby? I highly recommend the book *Cat's Cradle* by Kurt Vonnegut. For the majority of the pandemic I was working in NM and AZ while living in a trailer that was at a state wildlife area, so it didn't really feel like a quarantine already being far away from most people.

Present



Kayla Bruenig (C'22)

Tell us a bit about yourself. My name is Kayla Bruenig. I am from Sauk City, Wisconsin. I am currently a junior at UD, with a major in biology and chemistry and a minor in Spanish. I am also a member of the UD softball team.

What are your future plans? I plan on attending graduate school to earn my masters and doctorate degree. I have not yet decided what field of science I want to specialize in.

Why UD? I chose UD because of the small class sizes, professors that are very invested in their students, and the opportunity to do undergraduate research.

How has education shaped the person you are? Education has opened me to many new points of view and increased my understanding of the world around me. It also has allowed me to meet many new people. Some with similar educational interests as me, and others with different interests that I can relate to in other aspects of life.

What is one book you would recommend everyone read and what has been your favorite quarantine hobby? I recommend reading *Surrounded by Idiots* by Thomas Erickson. The book explains behavior types that define how people interact with and perceive others. Understanding these behaviors leads to better communication with all types of people. My favorite quarantine hobby has been going out birding.

Future



Riley Finn (C'26)

Tell us a little bit about yourself. My name is Riley Finn and I will be a freshman at UD next year! I will also be running for UD and I am so excited to be part of the team. Some of my favorite things are running, watching movies with friends, and my cat. :)

What are your future plans? My future plans are to become a Speech Therapist and Sign Language Interpreter. I am currently taking ASL classes and I love it! It has been so awesome to explore a whole new language.

Why UD? When I toured campus this summer with Coach Gunnelson, I fell in love with how beautiful and new everything was! The campus had a comforting feel right away. The people seem so personable and kind. I am beyond excited to become a Spartan.

How has education shaped the person you are? Education has taught me what my strengths are and how to overcome my weaknesses. Throughout high school there were some subjects that definitely did not come easy but that taught me how to work hard and push through!

What is one book you would recommend everyone read and what has been your favorite quarantine hobby? My favorite quarantine hobby has become hiking! Honestly, I was not much of an outdoorsy person until COVID hit and I had no choice! I now love going hiking anywhere whether it is in my backyard or on trails near me. It is so refreshing. A book I would totally recommend is *Girl, Stop Apologizing*. It is an awesome book for girls everywhere that teaches you how to build strength in yourself!



How have our science programs changed this semester?

Prof. Ken Turner: In CHM 111 (and CHM 112) we have had to come up with a full list of "remote" labs ... of at home "kitchen chemistry" labs and ... Lab Simulations.

Nathan Carter (C'22): ...a lot more assignments and solo things rather than large together labs that are in the field.

How else have you been using Zoom/Teams beside for classes?

Nathan Carter: ... job interviews a few times now

Prof. Ken Turner: I have attended my first Zoom funeral this year.

Prof. Adam Hoffman: ... connecting with prospective students, interacting with research collaborators, and weekly Jeopardy game nights with my immediate and extended family.

Reegan Sturgeon (C'20): ... hanging out with friends. We like to stream movies ... together on zoom.

To accommodate the students who've been remote, I've had to ...

Prof. Adam Hoffman: ... offer my classes face-to-face while live-streaming through Microsoft Teams ...; spend many more hours in one-one-one meetings (face-to-face and virtual) ...; utilize multiple [software] platforms ... to stay connected.

Prof. Lalith Jayawickrama: ... to chat with them more often [and] ask questions about how they are doing [and] if they can understand the course material.

It's been a challenging semester, though I'm glad ...

Prof. Dale Easley: ...we have managed to keep our Friday coffees [in a modified way] going for the 8th year.

Prof. Gerald Zuercher ...to have learned to manage classroom discussions/conversations in the online world. I have been very impressed with student engagement in discussion sessions. I actually think the conversations have been better than they were.

Olivia Costley (C'21) : ...I was able to build stronger relationships with classmates and professors while navigating Covid.

Hayli Wolf (C'20): ...I survived! I'm not alone in my struggles.

Jenna Meyers (C'21): ...I have my science family all by my side.

Prof. Michele Zuercher: I'm thankful I never got COVID.

What are you looking forward to next semester?

Prof. Kelly Grussendorf: Hopefully having more students in classes for lecture, that aren't out due to COVID isolation or quarantine [and]... teaching a new course - Neurophysiology!

Prof. Adam Kleinschmit: Snow!

Julia Rodewald (C'21): More classes!

The thing I wish I knew at the semester's start is ...

Nathan Carter: ... how difficult it can be to pay attention and learn when online, and how it was going to be so odd not seeing others' faces.

Reegan Sturgeon: ... when going to class is far better than being online. You do not realize how much you miss learning with others until you can't.

Prof. Kelly Grussendorf: ... to be better organized.

Jenna Meyers: ... to take a breath; not everything needs to get done at once.

An unexpected surprise has been...

Prof. David Koch: ... I never realized how much I rely on mouths and noses for identifying people.

Natalie Dienstbach (C'21): ... none of my teachers had to quarantine.

Anonymous (student): ... getting Covid and having to go to class being fairly sick. Getting over Covid took a lot longer than I expected.

Catching Up With...

Chemistry Club

Recent Events:

- Pumpkin Carving Party
- Visited a Corn Maze
- The River Museums Mad Scientist Party

Future Events:

- A Fundraiser/Raffle
- And More!



Livi at our pumpkin carving event filling a carved pumpkin with elephant toothpaste



Schuster's Pumpkin Patch corn maze.
Livi Schutz (C'21) and Julia Rodewald (C'21)

The Chemistry Club is a great place for anyone that is interested or wants to learn more about science! Our goal is to inspire a love of science in people through public outreach and educational field trips!

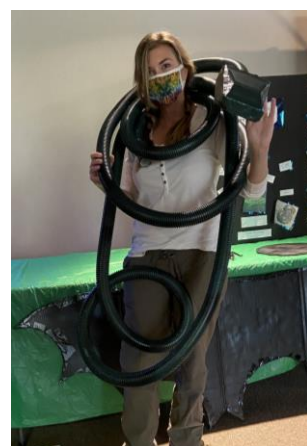
Web of Life

Recent Events:

- Park Clean-ups
- Autumnal Solstice Party
- The River Museums Mad Scientist Party

Future Events:

- Movie Night!
- Earth Day Celebration
- And More!



Hayli at the Mad Scientist Party at the River Museum and Aquarium



Fall Cleanup at Mines of Spain
L to R: Dillon Tierney (C'23), Forrest Martin (C'23), Dr. Adam Hoffman, Kal, Finn, Hayli Wolf (C'21), Julia Rodewald (C'21)

Web of Life is UD's environmental awareness club. We aim to educate everyone on environmental issues and inspire members to be more environmentally conscious through public outreach, clean-ups, and outdoor adventures! If you live on the earth, then you are welcome!

A Day In The Life (DNAS Style)...

"I'm currently finishing up the first semester of my senior year. The science courses I'm taking are environmental chemistry, botany, fish & wildlife management, and senior seminar. Additionally, I am in Army ROTC, training, and taking classes to commission into the Army upon graduation in the spring. This semester has been my most difficult yet, but it is partially because of the current pandemic we are in. The DNAS program does not get easier through the years but the university does a good job of setting a good foundation of learning. I learned early on how to manage my time and how to study and that has made the classes easier. Our program also has done an excellent job preparing me for my future career in the field of environmental science. I've been through several mock interviews, resume building classes, and practice GRE's. In the past year, I was also given the exciting opportunity to do my own research on snakes and their habitats through the Chlapaty Fellowship. Although this year has been challenging, I can see the light at the end of the tunnel and I'm excited to graduate in the spring."

Levi Buchholtz, Senior, Environmental Studies

"I am a junior biology major with a minor in chemistry. This semester, I am taking Anatomy and Physiology, Organic Chemistry, Microbiology, and Statistics. This is definitely my most challenging schedule I've had in college yet, so I do spend a lot of time outside the classroom trying to better my understanding so I can succeed this semester. Luckily, my professors are extremely helpful and are always opened to assist me, as well as helping my classmates to become the best students they can. This is a major reason why I appreciate being a part of DNAS; the ability to build connections with professors and them being so willing to help their students succeed in the classroom is really special. Being a part of the DNAS community is also beneficial because of the collaboration and teamwork among other students. For me, I have not met a classmate in this department that is not willing to help others, whether it be me or a different classmate. This makes my time here at UD less stressful and more enjoyable."

Jacob Whitbeck, Junior, Biology

"I am a transfer sophomore currently majoring in biology here at UD. Being a DNAS student feels very welcoming. Meeting all the teachers that are a part of this department was so great. They are all willing to help and they all are wanting you to succeed. They treat you as a person in the classroom and not a number. Currently I am taking General Chemistry and Botany. Next semester I will be adding Genetics and a Neurobiology class to Gen Chem as well. The workload can be a little much, especially while playing a sport, but it is all about finding time to do the homework and study as well. No matter the work load I am very happy to be continuing my path with great faculty and students in the science department."

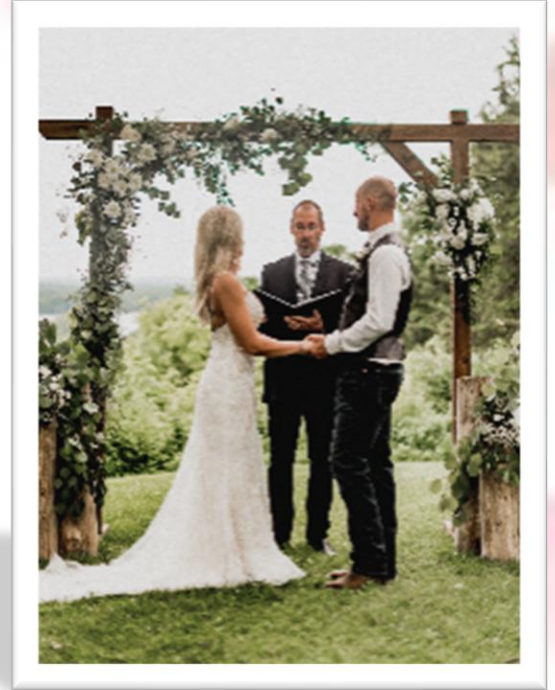
Julia Ellis, Sophomore, Biology

I Do....

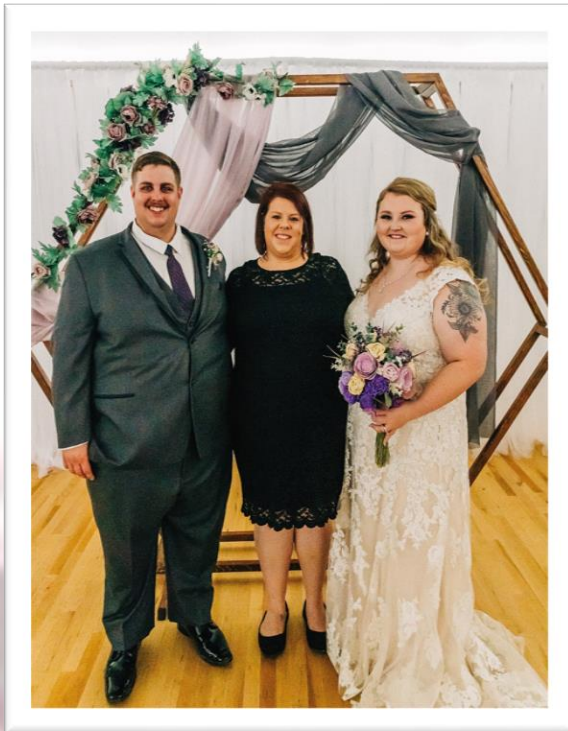
Professors at UD strive to make a difference on campus no matter how unorthodox the need.

At a small university, bonds between professors and students are formed that transcend classes and extend beyond graduation.

Our very own DNAS professors Dale Easley and Kelly Grussendorf had the unique and profound honor of officiating at former students' nuptials recently.



Dale Easley
Jena (Holland) (C'14) and Jakob Jepson (C'15)
June 2019



Kelly Grussendorf
Paige (Brown) (C'20) and Ryan Larion
October 2020



We're in this together!



Social distancing after a department meeting: Left to Right: R. Smith, R. Mudalige-Jayawickrama, M. Sinton, A. Kleinschmit, L. Jayawickrama, K. Turner, D. Easley, G. Zuercher, M. Zuercher, A. Hoffman, K. Grussendorf, D. Koch
Missing: A. Arora

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– NATURAL AND APPLIED SCIENCES –



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