



Minot State
UNIVERSITY

**2015 Faculty and Students
Research Poster Session
April 10, 2015
Book of Abstracts**



Minot State UNIVERSITY

2015 Faculty and Students
Research Poster Session
April 10, 2015
Book of Abstracts

*The Annual Research Poster Session and Book of Abstracts
is sponsored by the MSU Faculty Research Committee.*

*Edited by Mikhail M. Bobylev
Professor of Chemistry
Faculty Research Committee*

2015 MSU Research Poster Session – Book of Abstracts

TABLE OF CONTENTS

1. Training Teachers on the Plains: Educational Leadership, Centralized Control,..... 1
and the Development of Normal Schools in North Dakota and Saskatchewan, 1890-1930
Bethany Andreasen
Department of History/Division of Social Science, Minot State University
2. Rapid synthesis of N,N-dipiperonylformamide.....2
Melissa A. Bell, Nevin Gillis, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD
Division of Science – Chemistry, Minot State University
3. Acetamide as a solvent in the rapid synthesis of N-(2,4-dichlorobenzyl)formamide..... 3
Joel A. Collins, Mitchell A. Falkenberg, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD
Division of Science – Chemistry, Minot State University
4. Lucid Dreaming Consciousness.....4
Jesse Crosby, Addiction Studies, Teri Heidelberger, Psychology, & Shirley Cole-Harding Ph.D.
Psychology & Addiction Studies, Minot State University
5. Implementation of fluoride varnish as a quality improvement intervention 5
for primary care providers in rural pediatric population
Laurel Ann Dimler, MS, RN
Department of Nursing, Minot State University
6. Rapid synthesis of N-(2-hydroxybenzyl)acetamide6
Kaylee Dockter, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD
Division of Science – Chemistry, Minot State University
7. Effects of Transitions Live vs. Virtual Group Fitness Exercise on Body Image of Females Age 45 to 657
Terry Eckmann, Ph.D., Warren Gamas, Ph.D., Heather Golly, Ph.D.
Teacher Education and Human Performance, Minot State University
8. Effects of Transitions Live vs. Virtual Group Fitness Exercise on Fitness Measures in8
Females Age 45 to 65
Terry Eckmann, Ph.D., Warren Gamas, Ph.D., Heather Golly, Ph.D.
Teacher Education and Human Performance, Minot State University
9. Project: Animating a Key Moment in the History of Nonviolence:9
Costa Rica’s Abolition of the Military
Matthew Eddy
Division of Social Science, Minot State University

10.	Parent Satisfaction with Professional Services Received Regarding Cleft Lip and/or Palate.....	10
	Emily Gordon Department of Communication Disorders, College of Education and Health Sciences, Minot State University	
11.	Does Duration of Sleep Affect The Number of Dreams You Have?	11
	Morgan Hunter, Diondra Denton & Shirley Cole-Harding, Ph.D Psychology, Minot State University	
12.	Rapid synthesis of N,N,N-tri-(1-naphthylmethyl)amine	12
	Hye Ji Lee, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD Division of Science – Chemistry, Minot State University	
13.	Comparison of Numerical Procedures in Water Pollutant Transport Modeling.....	13
	Suzannah Miller, Narayan Thapa Department of Mathematics and Computer Science, Minot State University	
14.	Non-Locality in Breton Reconsidered	14
	Jean François-Mondon Foreign Language, Minot State University	
15.	Rapid Synthesis of N-(4-chlorobenzyl)-N-methylformamide	15
	Kowan O’Keefe and Mikhail Bobylev, PhD Division of Science – Chemistry, Minot State University	
16.	Rapid synthesis of N,N’-(4-chlorobenzylidene)-bis-formamide	16
	Samuel W. Olson and Mikhail M. Bobylev, PhD Division of Science – Chemistry, Minot State University	
17.	Studying chemical kinetics using carbon dioxide absorption on a platinum surface.....	17
	Samuel W. Olson Department of Mathematics and Computer Science, Minot State University	
18.	On the Numerical Solution of the Sine-Gordon Equation using Method of Lines	18
	Chloe Ondracek, Dr. Narayan Thapa Department of Mathematics and Computer Science, Minot State University	
19.	Rapid synthesis of N,N,N-tri(4-t-butylbenzyl)amine	19
	Shin Young Park, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD Division of Science – Chemistry, Minot State University	
20.	A Study of Language Related Content in Elementary and Special Education	20
	Teacher Preparation Programs Ann Beste-Guldborg, Ph.D., Holly F. Pedersen, Ed.D. Department of Special Education, Minot State University	

21. University Faculty, Staff, and, Student Perceptions of Disability in Society.....	21
Holly F. Pedersen, Ed.D., Department of Special Education, JoLynn Webster, M.Ed., Department of Special Education and ND Center for Persons with Disabilities, Minot State University	
22. Rapid Synthesis of N,N-di-(4-chlorobenzyl)formamide	22
Ann E. Richardson, Kowan O’Keefe, Lioudmila I. Bobyleva, MS; and Mikhail Bobylev, PhD Division of Science – Chemistry, Minot State University	
23. Health Consciousness based on Body Mass Index (BMI)	23
Kalpana Sanmugam, Psychology, Dayna Vanhouwe, Criminal Justice & Psychology, Sarah Willcoxon, AA, Social Work, & Shirley Cole-Harding, PhD., Psychology & Addiction Studies, Minot State University	
24. The flora of Pembina Gorge, Cavalier County, North Dakota.....	24
Shipunov, Alexey & Perry, Ryan Department of Biology, Minot State University	
25. Minot’s Sacred Geography.....	25
Dr. Jacob Sowers, Katy Flosi, Tyler Martin, Robert Schwartz Division of Social Science, Minot State University	
26. A Study of Artificial Neural Network Techniques Used to Mine Data in Astronomy.....	26
Hriday Bharat Thakkar, Dr. Narayan Thapa Department of Mathematics and Computer Science, Minot State University	
27. On the Numerical Treatment of Water Pollution Model.....	27
Jordan Torgunrud, Michal Gudejko, Narayan Thapa Department of Mathematics and Computer Science, Minot State University	
28. Film Effects on Sleep Patterns	28
Molly Willert, Social Work, Kayla Leintz, Social Work, Kelsey Weber, Criminal Justice Shirley Cole-Harding, PhD Psychology and Addiction Studies, Minot State University	

Training Teachers on the Plains: Educational Leadership, Centralized Control, and the Development of Normal Schools in North Dakota and Saskatchewan, 1890-1930

Bethany Andreassen, Department of History/Division of Social Science, Minot State University

Purpose: This project examines the establishment and development of normal schools in North Dakota and Saskatchewan during the late nineteenth and early twentieth centuries to analyze the factors underlying the divergent paths of normal school development, as the North Dakota normal schools became degree-granting teachers colleges in the 1920s, while the Saskatchewan institutions remained normal schools.

Methods: Research for this project is based upon work with primary and secondary historical sources pertaining to normal schools in Valley City and Minot (North Dakota) and Regina and Saskatoon (Saskatchewan). Primary historical sources include such materials as annual school catalogs, year-books, newspapers, legislation, institutional correspondence, legislative actions, and records of administrative entities. Secondary sources are books and articles published by historians of education.

Summary of Results: Examination of primary sources, especially school catalogs, reveals that individual North Dakota institutions, in their earliest years, began to offer courses beyond those required for teacher certification (music and commercial courses being the most common). The Saskatchewan Department of Education, however, produced a single “calendar” that spelled out the curriculum to be followed by each of the province’s normal schools.

Conclusion: Tight central control from the territorial/provincial Department of Education established a clear and limited curriculum for the Regina and Saskatoon Normal Schools. The North Dakota institutions, throughout this period, had the individual flexibility to expand their curriculum beyond courses required for teacher certification. This continuing expansion of curriculum contributed the most to differentiate the subsequent development of normal schools between North Dakota and Saskatchewan.

Supported by a 2014-15 faculty sabbatical from Minot State University, and a faculty research grant awarded by the Minot State University Faculty Research Committee.

Rapid synthesis of N,N-dipiperonylformamide

Melissa Bell, Nevin Gillis, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD
Division of Science – Chemistry, Minot State University, Minot, ND 58707

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of various benzylformamides. We also used acetamide as an alternative solvent for the Leuckart reaction. Interestingly, in the reaction conducted on 4-chlorobenzaldehyde, N-(4-chlorobenzyl)formamide was produced only as a minor product. The use of acetamide resulted in a substantial shift towards the products of the secondary and tertiary Leuckart reactions. Specifically, N,N-di(4-chlorobenzyl)formamide appeared to be the main product of the reaction with the isolated yield of 33.5%. N,N,N-tri-(4-chlorobenzyl)amine was produced with the isolated yield of 12.4%.

Hypothesis: The reaction conducted on benzaldehydes with electron-donating substituents should result in even larger shifts towards the products of the secondary and tertiary Leuckart reactions. In this work the hypothesis was tested by conducting the reaction on piperonal (3,4-methylenedioxybenzaldehyde).

Methods: The reaction was conducted on 10 mmol scale at 200°C. Column chromatography was used for the isolation of the products of the reaction. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

Results: The reaction was fully completed in 1 minute and produced N,N-dipiperonylformamide as the main product with the isolated yield of 34.1%. The tertiary reaction product, N,N,N-tripiperonylamine, was produced in substantially larger amount with the isolated yield of 20.0%. The combined yield of the di- and tri-products was 54.1%, significantly higher than the combined yield of the di- and tri-products in the 4-chlorobenzaldehyde reaction (45.9%).

Conclusions: A new approach to the rapid synthesis of N,N-dipiperonylformamide was developed.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Acetamide as a solvent in the rapid synthesis of N-(2,4-dichlorobenzyl)formamide

Joel A. Collins, Mitchell A. Falkenberg, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD
Division of Science – Chemistry, Minot State University, Minot, ND 58707

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of various benzylformamides. We also used acetamide as an alternative solvent for the Leuckart reaction. Interestingly, in the reaction conducted on 4-chlorobenzaldehyde, N-(4-chlorobenzyl)formamide was produced only as a minor product. The use of acetamide resulted in a substantial shift towards the products of the secondary and tertiary Leuckart reactions. Specifically, N,N-di-(4-chlorobenzyl)formamide appeared to be the main product of the reaction with the isolated yield of 33.5%. N,N,N-tri-(4-chlorobenzyl)amine was produced with the isolated yield of 12.4%.

Hypothesis: The reaction conducted on benzaldehydes with electron-withdrawing substituents should result in a less pronounced shift towards the products of the secondary and tertiary Leuckart reactions. In this work, this hypothesis was tested on 2,4-dichlorobenzaldehyde.

Methods: The reaction was conducted on 10 mmol scale at 198°C. Column chromatography was used for the isolation of the products of the reaction. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

Results: The reaction was fully completed in 1 minute. It produced N,N-di-(2,4-dichlorobenzyl)formamide and N,N,N-tri-(2,4-dichlorobenzyl)amine with the yields of 22.6% and 5.6%, only. N,N'--(2,4-dichlorobenzylidene)-bis-acetamide appeared to be the major product of the reaction with the yield of 36.1%.

Conclusions: Electron-withdrawing substituents reduced the shift towards the products of the secondary and tertiary Leuckart reactions.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Lucid Dreaming Consciousness

Jesse Crosby, Addiction Studies, Teri Heidelberger, Psychology, & Shirley Cole-Harding Ph.D. Psychology & Addiction Studies, Minot State University

Lucid dreaming was discovered many years ago. The main definition that has been used is that the individual must recognize that they are dreaming and be able to control or remember portions of their dream. Our questionnaire asks specific questions that will help us determine if the individuals participating in our study meet each of the requirements for lucid dreams.

The seven requirements are as follows:

1. Awareness of dream state
2. Awareness of the ability to make decisions
3. Awareness of memory functions
4. Awareness of identity
5. Awareness of dream environment
6. Awareness of dream meaning
7. Awareness of concentration and focus

From our results, we hope to be able to clarify if men or women tend to lucid dream more than the other and if age is a factor in the number of lucid dreams. We are also curious to know if people who spend more time in a virtual world are more likely to recognize that they are in a dream and can therefore lucid dream more frequently than people who are not submerged in a virtual reality.

The submissions of the survey will also help us clarify if there are a greater number of lucid dreamers among those who are more emerged in forms of media such as movies, video games, television shows, and music.

Implementation of Fluoride Varnish as a Quality Improvement Intervention for Primary Care Providers in a Rural Pediatric Population

Laurel Ann Dimler, MS, RN, Department of Nursing, Minot State University

The purpose of this study was to study implementation of preventive oral health interventions by primary care providers in a rural pediatric population. Acknowledgement of dental caries as a preventable communicable disease indicates that activities and interventions to prevent oral complications are being expanded to multiple disciplines. Primary care providers are acknowledged as partners in health and prevention of chronic illness. Collaboration between dental services and pediatric primary care in the communities of central and northwestern North Dakota is proposed as a method to bridge the gap of health disparities between urban and rural counterparts.

The study included five rural clinics and involved 25 providers in education regarding fluoride varnish application and oral risk assessment. Rating of oral health knowledge before the intervention and after the intervention on a 1 to 10 scale by primary care providers was 6.05 (n=23) and 6.33 (n=18) respectively. Following education and introduction of fluoride varnish into practice, 16.7% (n=18) primary care providers indicated using fluoride varnish. Nurses were the majority of respondents in the study and the most likely to perform fluoride varnish. Implications from the study indicate further incentives will be necessary to increase the number of primary care patients treated with fluoride varnish. The North Dakota Oral Health program reports 4,609 Medicaid claims were filed for oral prevention services by primary care providers in 2012-2014, the period during which concerted efforts to educate providers and implement fluoride varnish were initiated.

Rapid synthesis of N-(2-hydroxybenzyl)acetamide

Kaylee Dockter, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD, Division of Science – Chemistry, Minot State University, Minot, ND 58707

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid Leuckart reaction procedure for the synthesis of substituted benzylformamides. We also used acetamide as an alternative solvent for the Leuckart reaction. Interestingly, in the reaction conducted on 4-chlorobenzaldehyde, N-(4-chlorobenzyl)formamide was produced as a minor product with an isolated yield of only 14.4%. The use of acetamide resulted in a substantial shift towards the products of the secondary and tertiary Leuckart reactions. Specifically, N,N-di(4-chlorobenzyl)formamide was produced as the main product with an isolated yield of 33.5%. The reaction also produced N-(4-chlorobenzyl)acetamide with an isolated yield of 16.0%. It was the first example of an amide other than formamide produced in the Leuckart reaction.

Hypothesis: The reaction conducted on benzaldehydes with electron-donating substituents may result in even larger shifts towards the products of the secondary and tertiary Leuckart reactions. In this work this hypothesis was tested on 2-hydroxybenzaldehyde.

Methods: The reaction was conducted on 10 mmol scale at 189°C. Column chromatography was used for the isolation of the products of the reaction. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

Results: The reaction was fully completed in 7 minutes. Surprisingly, N-(2-hydroxybenzyl)acetamide appeared to be the main product of the reaction with an isolated yield of 32.9%. N,N-di-(2-hydroxybenzyl)formamide was produced as the second major product with an isolated yield of 22.9%.

Conclusions: The first Leuckart reaction producing an amide, other than formamide, as the main product, was conducted. A new approach to the rapid synthesis of N-(2-hydroxybenzyl)acetamide was developed.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Effects of Transitions Live vs. Virtual Group Fitness Exercise on Body Image of Females Age 45 to 65

Terry Eckmann, Ph.D., Warren Gamas, Ph.D., Heather Golly, Ph.D., Teacher Education and Human Performance, Minot State University

Purpose: This research project is designed to explore the effects of a new delivery approach to group fitness on body image by providing Live and Virtual Transition group exercise programming. To determine impact of live vs. virtual Transitions on body image the Multidimensional Body-Self Relations Questionnaire (MBSRQ), a well-validated self-report inventory for the assessment of body image, was administered before and after the Transitions intervention.

Methods: Sedentary adults aged 45 to 65 years were selected to be in one of three groups of 25 for a 10 week time frame: WELLBEATS™ Transitions live group or WELLBEATS™ Transitions virtual group or non-exercise group. The eight-week program required participants in the WELLBEATS™ Transitions live group and the WELLBEATS™ Transitions virtual group to exercise three days a week for 10 weeks.

Summary of Results and Conclusion: A repeated measures GLM revealed a significant multivariate within group effect for time (pre-post test), Wilks' = .335, $F(10, 30) = 5.96$, $p < .001$, partial eta squared = .665 indicating that participation in Transitions Live and Virtual fitness exercise programs impact participants' perceptions on between body image, body weight, eating issues, and physical appearance. No significant difference between perceptions on body image, body weight, eating issues, and physical appearance was found between types of fitness exercise, Wilks' = .805, $F(10, 30) = 0.727$, $p = .693$, partial eta squared = .195.

Effects of Transitions Live vs. Virtual Group Fitness Exercise on Fitness Measures in Females Age 45 to 65

Terry Eckmann, Ph.D., Warren Gamas, Ph.D., Heather Golly, Ph.D., Teacher Education and Human Performance, Minot State University

Purpose: This research project is designed to explore the effects of a new delivery approach to group fitness on body image by providing Live and Virtual Transition group exercise programming. To determine impact of live vs. virtual Transitions on fitness measures including: body composition, weight, BMI, resting heart rate, blood pressure, muscle endurance and flexibility, cardiovascular endurance.

Methods: Sedentary adults aged 45 to 65 years were selected to be in one of three groups of 25 for a 10 week time frame: WELLBEATS™ Transitions live group or WELLBEATS™ Transitions virtual group or non-exercise group. The eight-week program required participants in the WELLBEATS™ Transitions live group and the WELLBEATS™ Transitions virtual group to exercise three days a week for 10 weeks.

Summary of Results and Conclusion: A repeated measures GLM revealed a significant multivariate within group effect for time (pre-post test), Wilks' = .133, $F(12, 18) = 9.82$, $p < .001$, partial eta squared = .867 supporting the impact of exercise on fitness. Transitions Live and Virtual group exercising programs both showed significant improvements on ten of the thirteen fitness measures fitness measures. No significant difference was found between types of fitness exercise: Transitions Live and Transitions Virtual, Wilks' = .532, $F(13, 17) = 1.15$, $p = .468$, partial eta squared = .468.

Animating a Key Moment in the History of Nonviolence: Costa Rica's Abolition of the Military

Matthew Eddy, Division of Social Science, Minot State University

Through a collaboration between Matthew Eddy and Micah Bloom (Assistant Art Professor at Minot State University), and with assistance from MSU art student Takuma Abe, this project animates significant events in Costa Rican history for which no film record exists: namely, events surrounding the abolition of the military on December 1, 1948. Because Costa Rica is the largest nation in the world to abolish their military, and because Costa Rica has lived for 65 years without a military, these events are of significant historical interest for scholars of peace, diplomacy, and national security studies.

The animated segments include: 1) the symbolic gesture of Jose Figueres who used a sledgehammer to smash the battlements of the nation's military barracks, 2) the speech Jose Figueres gave during the abolition ceremony, and 3) a short press conference which condenses several rationales for abolition which Figueres offered during the period. Despite the fact that these events proved to be pivotal in the creation of modern Costa Rica, this project represents the first time they have been depicted in a film format of any kind. The animation segments will be featured in Dr. Eddy's forthcoming documentary film about Costa Rica titled "A Bold Peace." The project began with archival research by Eddy in Costa Rica and proceeded with an analog artistic process under the direction of Micah Bloom, which involved cut paper, stop-motion animation, voice recordings of three actors, and digital layering and syncing in Premier Pro.

Support: Funded by the 2014-2015 Small Grant for Faculty Research, Minot State University

Parent Satisfaction with Professional Services Received Regarding Cleft Lip and/or Palate

Emily Gordon, Department of Communication Disorders, College of Education and Health Sciences, Minot State University

This study investigated parent satisfaction with professional services received regarding cleft lip and/or palate (CL/P) in the Midwest region of the United States (U.S.). With the small prevalence of children born with CL/P in the Midwest U.S., professionals may not have the experience and hence the knowledge to provide complete and satisfactory treatment to the children and families. This research investigated parent satisfaction with the experience of their child's birth and throughout the initial hospital stay, satisfaction with child's current abilities, and current satisfaction with professional services received.

Parents completed a survey composed of three sections. The first section determined parents' perception of the family centeredness of services received. Additionally, parents rated their current satisfaction with their child's abilities, as well as with professionals who worked with their family. Parents were given the choice to provide anecdotal comments within each section of the survey.

Results indicated parents were generally satisfied with the treatment they received at birth and throughout the initial hospital stay, as well as with their child's abilities and experiences with professionals. A strong positive correlation existed between satisfaction with professionals and satisfaction with child's abilities, which suggested parent satisfaction with professionals was a good predictor of parent satisfaction with child's abilities. No significant relationships were found between satisfaction at birth and satisfaction with child's abilities, as well as between satisfaction at birth and satisfaction with professionals. These results suggested satisfaction at birth was not a good predictor of current satisfaction with child's abilities and/or professional services received.

Does Duration of Sleep Affect The Number of Dreams You Have?

*Morgan Hunter, Diondra Denton & Shirley Cole-Harding, Ph.D Psychology,
Minot State University*

Research has shown that there is much information and knowledge regarding why we dream, how we dream and interpreting what dreams mean. However we struggled to find whether the number of dreams someone experiences is related to the amount of sleep they have. The purpose of this study is to find out whether there is a relationship between duration of sleep and how frequently we dream. In our study we surveyed 60 Minot State students about their sleep habits and dreams, providing short answer questions and questions involving a rating scale. This study shows the correlation among different variables asked about in our survey.

Rapid synthesis of N,N,N-tri-(1-naphthylmethyl)amine

Hye Ji Lee, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD, Division of Science – Chemistry, Minot State University, Minot, ND 58707

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of various benzylformamides. We also used acetamide as an alternative solvent for the Leuckart reaction. Interestingly, in the reaction conducted on 4-chlorobenzaldehyde, N-(4-chlorobenzyl)formamide was produced only as a minor product. The use of acetamide resulted in a substantial shift towards N,N-di-(4-chlorobenzyl)formamide and N,N,N-tri-(4-chlorobenzyl)amine that were produced with the isolated yields of 33.5% and 12.4%. N,N-di-(4-chlorobenzyl)formamide appeared to be the main product of the reaction.

Hypothesis: The reaction conducted on electron rich benzaldehydes should result in even larger shifts towards the products of the secondary and tertiary Leuckart reactions. In this work the hypothesis was tested by conducting the reaction on 1-naphthylcarboxaldehyde.

Methods: The reaction was conducted on 10 mmol scale at 200°C. Column chromatography was used for the isolation of the products of the reaction. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

Results: The reaction was fully completed in 1 minute and produced N,N,N-tri-(1-naphthylmethyl)amine as the main product with the yield of 40.9%. The secondary reaction product, N,N-di-(1-naphthylmethyl)formamide, was produced with the yield of 31.5%. The combined yield of the di- and tri-products was 72.4%, significantly higher than the combined yield of the di- and tri-products in the 4-chlorobenzaldehyde reaction (45.9%).

Conclusions: A new rapid method for the synthesis of N,N,N-tri-(1-naphthylmethyl)amine was developed. The method comprises the first example of a successful refocusing of the Leuckart reaction towards the predominant formation of the tertiary products.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Comparison of Numerical Procedures in Water Pollutant Transport Modeling

Suzannah Miller, Narayan Thapa, Department of Mathematics and Computer Science, Minot State University

Water quality, as indicated by the level of water pollution, can be described through mathematical models of the transport of the pollutant of interest. The concentration of the pollutant at a given location in a water body depends on the natural movement and biochemistry of the water body. A fundamental differential equation of transport can be developed that accounts for advection, dispersion, and the nonconservative nature of some pollutants. The solution of this differential equation gives the concentration of the pollutant at any point in the volume of water being considered. This research used MATLAB programming to solve the pollutant transport equation using two numerical methods: the finite difference method and the finite element method. Qualitative differences were noted between the solutions from both methods. Ultimately, these results will be compared to the analytical solution for error analysis.

Support: Faculty Research Mini-Grant, Minot State University

Non-Locality in Breton Reconsidered

Jean François-Mondon, Foreign Languages, Minot State University

Stump (1988) presented the interesting observation that in some dialects of Breton the mutation on a noun is caused by a more distant word rather than a closer word. The specific construction is the following:

(1) *va my + holl all + NOUN*

he her

o their

The three possessive adjectives *va*, *he*, and *o* all induce spirantization. On the other hand *holl* induces lenition. In the context in (1), certain dialects of Breton have been described as having the spirantization of the possessive adjectives occur in lieu of the lenition of *holl* (Kervella (1947), Trépos (1980)).

(2) /*va holl tud*/ > *va holl zud*

**va holl dud*

Stump was not able to get around the apparent non-locality of this rule in his own analysis, though recent developments in Distributed Morphology (Embick 2013) offer a solution. By treating the Breton possessive adjectives *va*, *he*, and *o* as triggering a morphophonological (M/P) rule whose target is phonological and not morphological, the apparent non-locality of (2) vanishes. Since *holl* does not begin in a mutable sound, it is passed over and spirantization affects the following noun.

By adopting Bošković's (2014) contextual approach to phasehood the proposed M/P rule of Breton is limited to occur within its phase. This limitation prevents spirantization from skipping a noun with no initial mutable consonant and affecting a subsequent word beyond the noun.

(3) /*va dor torret*/ my broken door > *va dor torret*

**va dor zorret*

In (3) *va dor* and *torret* are in different phases, hence the spirantization of *va* is unable to skip *dor* and affect *torret*.

Rapid Synthesis of N-(4-chlorobenzyl)-N-methylformamide

Kowan O'Keefe and Mikhail Bobylev, PhD

Division of Science – Chemistry, Minot State University, Minot, ND 58707

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of substituted N-benzyl-N-methylformamides. Interestingly, in the reaction conducted on piperonal (3,4-methylenedioxybenzaldehyde), a large amount of a by-product, N-methyl-N,N-dipiperonylamine was produced with an isolated yield of 32.8%. N-methyl-N-piperonylformamide was produced as the main product with an isolated yield of 51.4%.

Hypothesis: The reaction conducted on benzaldehydes with electron-withdrawing substituents may produce lower yields of the by-products (substituted N,N-dibenzyl-N-methylamines) and higher yields of the main products, substituted N-benzyl-N-methylformamides. In this work the hypothesis was tested by conducting the reaction on 4-chlorobenzaldehyde.

Methods: The reaction was conducted on 10 mmol scale at 175°C. Column chromatography was used for the isolation of the products of the reaction. NMR-spectroscopy and elemental analysis were used to determine the structures of the products.

Results: The reaction was fully completed in 10 minutes and produced N-(4-chlorobenzyl)-N-methylformamide as the main product with an isolated yield of 52.0%. N,N-di-(4-chlorobenzyl)-N-methylamine was produced as the main by-product with an isolated yield of 31.3%.

Conclusions: A new rapid method for the synthesis of N-(4-chlorobenzyl)-N-methylformamide was developed.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Rapid synthesis of N,N'-(4-chlorobenzylidene)-bis-formamide

*Samuel W. Olson and Mikhail M. Bobylev, PhD, Division of Science – Chemistry,
Minot State University, Minot, ND 58707*

mikhail.bobylev@minotstateu.edu

Background: In our lab, we have been extensively using the Leuckart reaction for the synthesis of novel antifungal compounds. Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of substituted N-benzylformamides. We also found that the reaction typically produces three minor byproducts, specifically, substituted N,N-dibenzylformamides, substituted N,N,N-tribenzylamines, and substituted N,N'-benzylidene-bis-formamides. It was interesting to investigate if the procedure could be modified towards the selective production of any of these by-products.

Hypothesis: Replacing formic acid as the catalyst and the reducing agent with oxalic acid that can act only as a catalyst may lead to a selective production of substituted N,N'-benzylidene-bis-formamides. In this work the hypothesis was tested by conducting the reaction on 4-chlorobenzaldehyde.

Methods: The reaction was conducted on 10 mmol scale at 133°C. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

Results: The reaction was fully completed in 1 minute and produced N, N'-(4-chlorobenzylidene)-bis-formamide as the main product with the isolated yield of 67.4%.

Conclusions: A new rapid method for the synthesis of N,N'-(4-chlorobenzylidene)-bis-formamide was developed.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Studying chemical kinetics using carbon dioxide absorption on a platinum surface

Samuel W. Olson, Department of Mathematics and Computer Science, Minot State University

Studying chemical kinetics using carbon dioxide absorption on a platinum surface as a template are studied by different inverse modeling techniques. It is shown that the results can be expanded to any number of chemical problems. Mechanisms were studied using a system of 4 ordinary differential equations along with Lavoisier's law of mass conversion to try and find a stable solution. It is shown that a small change to our mechanism can cause drastic changes to our solution and helps determine our limits of our solutions. This stability was tested using computer analysis.

On the Numerical Solution of the Sine-Gordon Equation using Method of Lines

Chloe Ondracek, Dr. Narayan Thapa, Department of Mathematics and Computer Science, Minot State University

In this work we study the numerical approximation to the Sine-Gordon equation using the method of lines. The method involves a discrete space domain and a continuous time domain. The finite difference approximations to the space derivatives are used and compared. A system of second order ordinary differential equations is developed and then converted to systems of first order equations. MATLAB codes will be developed and implemented. Numerical results were achieved.

Supported by the Center for Engaged Teaching and Learning, Minot State University.

Rapid synthesis of N,N,N-tri(4-t-butylbenzyl)amine

Shin Young Park, Lioudmila I. Bobyleva, MS; and Mikhail M. Bobylev, PhD, Division of Science – Chemistry, Minot State University, Minot, ND 58707

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of various benzylformamides. We also used acetamide as an alternative solvent for the Leuckart reaction. Interestingly, in the reaction conducted on 4-chlorobenzaldehyde, N-(4-chlorobenzyl)formamide was produced only as a minor product. Instead, N,N-di-(4-chlorobenzyl)formamide was produced as the main product of the reaction with the isolated yield of 33.5%. N,N,N-tri-(4-chlorobenzyl)amine was produced with the isolated yield of 12.4%.

Hypothesis: The reaction conducted on benzaldehydes with electron-donating substituents should result in even larger shifts towards the products of the secondary and tertiary Leuckart reactions. In this work the hypothesis was tested by conducting the reaction on 4-t-butylbenzaldehyde.

Methods: The reaction was conducted on 10 mmol scale at 200°C. Column chromatography was used for the isolation of the products of the reaction. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

The reaction was fully completed in 1 minute and produced N,N,N-tri(4-t-butylbenzyl)amine as the main product with the isolated yield of 29.8%. The secondary reaction product, N,N-di-(4-t-butylbenzyl)formamide, was produced with the isolated yield of 22.3%. The combined yield of the di- and tri-products was 52.1%, significantly higher than the combined yield of the di- and tri-products in the 4-chlorobenzaldehyde reaction (45.9%).

Conclusions: The reaction comprises a successful example of refocusing the Leuckart reaction towards the predominant formation of the tertiary products. The reaction provides an important step towards a new rapid method for the synthesis of N,N,N-tri-(4-t-butylbenzyl)amine.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

A Study of Language Related Content in Elementary and Special Education Teacher Preparation Programs

Ann Beste-Guldborg, Ph.D., Holly F. Pedersen, Ed.D.

Department of Special Education, Minot State University

Problem Statement and Purpose of the Study: Language is present in all aspects of learning and poor language skills are cited as a risk factor for both literacy failure and later academic struggles. Over the years there have been calls for teacher preparation programs to include explicit instruction in the development of language, the relationship of language to literacy and later academic success, and on the impacts of language disorders on learning. This study examines the extent to which language related content is present in the curricula of elementary and special education teacher preparation programs across the United States. Specifically, it will ask about course work related to language development, language disorders, and the relationship of language to literacy development.

Brief Methodology: A curriculum review of 150 randomly selected university preparation programs in elementary education and special education across the United States was conducted looking for coursework specific to language development, language disorders, and the language-literacy connection. Data was analyzed quantitatively using descriptive statistics to report the numbers and types of language related coursework at various higher education programs that prepare elementary and special education teachers.

Results & Conclusion Summary: Results indicate a wide variance across both elementary and special education teacher preparation programs in regards to the inclusion of language related coursework in their curriculum. The majority of language related coursework appeared in early childhood programs. Language related content also appeared in growth and development, language arts, and reading methods courses. A few programs address this topic in ELL coursework. Fourteen percent of the sample listed no language related coursework in the curriculum. Because the accreditation of teacher preparation programs requires the inclusion of the knowledge of linguistic diversity into teacher candidate coursework, follow up was conducted for this 14% to gain a clear understanding of the curriculum. Some institutions' state departments of education require integration of language into all aspects of teacher preparation curriculum, while others do not offer coursework specifically addressing this topic. Next steps in this research vein and implications for teacher preparation programs are discussed.

This project is funded in part by an MSU Small Faculty Research Grant

University Faculty, Staff, and, Student Perceptions of Disability in Society

Holly F. Pedersen, Ed.D., Department of Special Education, JoLynn Webster, M.Ed., Department of Special Education and ND Center for Persons with Disabilities, Minot State University

Problem Statement and Purpose of the Study: Individuals with disabilities represent one of the fastest growing populations of students in postsecondary education. Research indicates university faculty, staff, and students are generally supportive of the inclusion of students with disabilities on campus; however, they often lack disability awareness and understanding to foster a positive environment for such students. The purpose of this study was to examine perceptions of faculty, staff, and students at MSU relative to aspects of disability in society and potential actions for social change based on these perceptions.

Brief Methodology: Participants for the study were MSU faculty, staff, and students. A series of 6 face-to-face training sessions were conducted on campus relative to disability awareness. A mixed-method research design was employed using a pre and post training survey for the quantitative data and participant written reflections as qualitative data. Both forms of data were analyzed to determine participant change in disability perceptions as well as commonalities in reflections on participation in the awareness training.

Results & Conclusion Summary: Results indicate positive change in participants' perceptions of disability related issues in society. Various aspects of evolution of self-reflection and disability awareness were identified for the group as a whole. Common themes for action and implications for social change are discussed.

Rapid Synthesis of N,N-di-(4-chlorobenzyl)formamide

*Ann E. Richardson, Kowan O'Keefe, Lioudmila I. Bobyleva, MS; and Mikhail Bobylev, PhD
Division of Science – Chemistry, Minot State University, Minot, ND 58707*

mikhail.bobylev@minotstateu.edu

Background: Recently, we developed a rapid procedure for the Leuckart reaction and successfully applied it for the synthesis of various benzylformamides. We also used acetamide as an alternative solvent for the Leuckart reaction. Interestingly, in the reaction conducted on 4-chlorobenzaldehyde, N-(4-chlorobenzyl)formamide was produced only as a minor product with an isolated yield of only 14.4%. The use of acetamide resulted in a substantial shift towards the products of the secondary and tertiary Leuckart reactions. Specifically, N,N-di-(4-chlorobenzyl)formamide appeared to be the main product of the reaction with the isolated yield of 33.5%. N,N,N-tri-(4-chlorobenzyl)amine was produced with the isolated yield of 12.4%.

Hypothesis: Increased concentration of 4-chlorobenzaldehyde may result in an even larger shift towards the products of the secondary and tertiary Leuckart reactions and may lead to higher yields of N,N-di-(4-chlorobenzyl)formamide and N,N,N-tri-(4-chlorobenzyl)amine.

Methods: Four reactions with different ratios of the reagents were conducted. Column chromatography was used for the isolation of the products of the reactions. NMR-spectroscopy and elemental analysis were used to determine the structure of the products.

Results: All of the reactions produced N,N-di-(4-chlorobenzyl)formamide as the main product. The highest isolated yield of N,N-di-(4-chlorobenzyl)formamide was 39.7%. The same reaction produced N,N,N-tri-(4-chlorobenzyl)amine in a substantially larger amount with the isolated yield of 16.7%. The combined yield of the di- and tri-products was 56.4%, which is significantly higher than the combined yield of the di- and tri-products in the original reaction (45.9%).

Conclusions: An improved method for the rapid synthesis of N,N-di-(4-chlorobenzyl)formamide has been developed.

Supported by NIH grant 8 P20 GM103442-12 from the National Institute of General Medical Sciences.

Health Consciousness based on Body Mass Index (BMI)

Kalpana Sanmugam, Psychology, Dayna Vanhouwe, Criminal Justice & Psychology, Sarah Willcoxon, AA, Social Work, & Shirley Cole-Harding, PhD., Psychology & Addiction Studies, Minot State University

This manuscript will depict an experiment and data collected by the use of a survey handed out to fifty individuals on the Minot State University campus. We will be studying students' body mass index to get a better idea of how healthy students on our campus are, finding out how aware those individuals are of their health, and to possibly make them more aware of their health through the use of the survey. The data collected will be analyzed by the researchers conducting the survey. The data analysis will be presented in a series of charts and tables throughout the manuscript depicting the results of health consciousness here on the Minot State University campus. The charts and tables as well as the data gathered will be compared to what is found by the Center for Disease Control to be an average BMI for both genders and varying heights and weights. A separate section will be designated for the Body Mass Index (BMI) section; with calculations, a graph, details on the results and how the results were obtained. The final BMI calculation is the primary purpose of this experiment – to show how health conscious this campus is and what the average BMI is.

The flora of Pembina Gorge, Cavalier County, North Dakota

Shipunov, Alexey & Perry, Ryan, Department of Biology, Minot State University

North Dakota is among a few North American regions which have not been researched in full for plant diversity. Before 2011, only 55% of state territory was covered with botanical research. From 2011, we are surveying “botanical white spots” using 30 x 30 miles virtual grid (Shipunov et al., 2015). Every plant was photographed, geo-referenced (with precise GPS coordinates) and collected for the herbarium of Minot State University (now officially registered and internationally recognized as “MISU”). However, in North Dakota we also have the different type of locations, unresearched “hot spots” where plant diversity is dramatically higher than in surrounding areas. One of them is the Pembina Gorge Area. The Pembina Gorge region lies north to south along the landform known in Canada as the “Manitoba Escarpment” and in the United States as the “Pembina Escarpment” (Willenbring, 1971). The region begins in North Dakota and extends north of the Manitoba-North Dakota border (Marshall, 1989). The area of study consists of the natural, uncultivated areas, much of which is open to the public. The Pembina Gorge has never been the focus of a floristic study. We made three collection trips, and prepared 198 plant samples deposited now in MISU herbarium. These herbarium specimens along with plant photographs made in natural environment will complement our existing records from 2012 and altogether will be the source of the comprehensive plant list for the Pembina Gorge region of North Dakota.

Supported by Small Research Grant (MSU).

Minot's Sacred Geography

Dr. Jacob Sowers, Katy Flosi, Tyler Martin, Robert Schwartz, Division of Social Science, Minot State University

The recent expansion of the Bakken oil field energy landscape has effectively changed the place identity of western North Dakota. Change, in and of itself is neither good nor bad. What makes change a problem is when there is a great disturbance in “dwelling” or the ability to feel at-home in one’s hometown. Many residents in Minot have experienced a harmful shift in their place experience, going from dwelling and at-homeness to that of alienation and nostalgia. Geographers refer to this shift in place attachment as an experiential displacement from existential insiderness to existential outsidership.

This paper highlights my research that has sought to reverse this trend by seeking and sustaining the everyday sacred spaces and places where the community has grown or could grow strong roots. Through surveys and semi-structured interviews my research evaluated the change to Minot’s sense of place (from the resident’s point-of-view) due to the oil boom; discovered Minot resident’s important spaces and places and why they are important; and demarcated Minot’s everyday “sacred geography” and how it may be protected and expanded in the midst of increased change to the community’s landscape, activities, and meaning.

Through this study Minot’s pre-oil boom sense of place and the impact of the oil boom on that sense of place is becoming clearer, as are the important spaces and places where residents connect their personal/group identities. I introduce some examples and methods for creating and preserving Minot’s sacred spaces.

Support: 2013 MSU Faculty Research Small Grant

A Study of Artificial Neural Network Techniques Used to Mine Data in Astronomy

Hriday Bharat Thakkar, Dr. Narayan Thapa, Department of Mathematics and Computer Science, Minot State University

Artificial neural networks (ANNs) are mathematical models, which are inspired by the structure and function of biological neurons. They have a long history of being used as computational tools in various fields of sciences because of their capability to perform pattern recognition and function approximation. In the recent decade, there has been a large scale increase in the collection of data of cosmic entities such as galaxies and stars, and of high energy physics. In addition to this, the difficulty associated with manually interpreting the large amounts of data led the astronomical community to begin implementing ANNs to perform various tasks such as classification of gamma-ray bursts, identification of a star from a galaxy, estimation of astrophysical parameters and the like. It's been shown that pre-processing the input data using principal component analysis, which is a statistical method to perform dimensionality reduction, increases computational efficiency. In this presentation, after briefly outlining why ANNs are being used as data mining tools, we discuss an application of ANNs to solve an inverse problem in astronomy, namely to estimate stellar atmospheric parameters from observed spectral lines. We conclude by outlining the results of pre-processing the data using principal component analysis before performing inversion of observed spectral line.

Support: Faculty Research Grant

On the Numerical Treatment of Water Pollution Model

Jordan Torgunrud, Michal Gudejko, Narayan Thapa

Department of Mathematics and Computer Science, Minot State University

The purpose of this research is to construct a model that accurately represents the hydrodynamics of contaminants moving through a groundwater system using a partial differential equation. The model must be supported by scientific evidence and be analytically and numerically solved.

A brief literature review was conducted to determine models currently used to model hydrodynamic flow in various situations, and to determine the type of model that we wished to work with. The model was then constructed using assumptions made based on the data from the literature review as well as scientific knowledge. Modifications were then made to the model in order to ensure that it was analytically and numerically solvable, as well as scientifically accurate. The model was then analytically solved using known methods and the Finite Difference Method was used to find the numerical solutions using Matlab software. The analytical and numerical solutions were then compared to determine the error and show the accuracy of the computation.

The analytical and numerical solutions show very little error when compared, and thus we can assume that our numerical results are accurate for the model. The numerical solutions, in graph form, demonstrate the implications of contamination of groundwater resources and can be used as a tool to determine how the contaminant is moving throughout the system.

Supported by Minot State University Center for Engaged Teaching and Learning (CETL)

Film Effects on Sleep Patterns

Molly Willert, Social Work, Kayla Leintz, Social Work, Kelsey Weber, Criminal Justice, and Shirley Cole-Harding, PhD, Psychology and Addiction Studies, Minot State University

This paper explores the triggers of images among sleep cycles in reference to films. Different aspects in life cause sleep disturbance, yet few studies have been conducted on whether or not the use of electronics and technology such as viewing horror movies or romantic movies before bed will trigger certain dreams and have an effect on sleep cycles. Two possible explanations have been discussed: the romantic film will cause pleasant dreams, and the horror film will cause nightmares. The literature found does not provide a strong hypothesis for any explanation. This study will have participants fill out a written survey before the film is viewed in order to gain perspective on the participant's regular sleeping pattern. A survey will also be taken the morning after the experimental night in order to provide results to analyze. The implication for this study is to determine whether certain films being watched before one falls asleep seems to trigger certain dreams or nightmares and will give insight into sleeping patterns.

