

Undergraduate Symposium 2005

Celebrating Research, Creative Endeavor and Service-Learning

University of Wisconsin–Madison Memorial Union

April 12, 2005

- 9:45 a.m. Welcome to Student Participants,
by Associate Vice Chancellor Virginia Sapiro,
Great Hall
- 10:00 a.m.–4:00 p.m. Posters and Art/Research displays, Great Hall
- 10:00 a.m.–11:30 a.m. Oral Presentations, Session I
(see signs or registration table on 4th floor
for specific student presentation times and
locations)
- 12:00 p.m.–1:30 p.m. Oral Presentation, Session II
- 2:00 p.m.–3:30 p.m. Oral Presentations, Session III

Refreshments will be available starting at 9:30 a.m. and will be available throughout the day in Great Hall.

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Celebrating Research, Creative Endeavor and Service-Learning

*University of Wisconsin – Madison
April 12, 2005*

The seventh annual Undergraduate Symposium is a celebration of undergraduate students' accomplishments across the many Schools and Colleges at UW–Madison. The Symposium includes oral and poster presentations by groups and individuals representing the arts and humanities, biological sciences, physical sciences, and social sciences. These original works showcase the vast range of talent and creativity within the University's undergraduate population.

The seventh annual Undergraduate Symposium is sponsored by the Brittingham Trust and the Office of the Provost, through the stewardship of the Undergraduate Research Scholars Program, the Center for Biology Education, the Morgridge Center for Public Service, and The Wisconsin Union.

A Special Thanks!

We would like to thank the Undergraduate Research Scholars Program for giving the annual Symposium a permanent home, and its director, Akua Sarr, for her tremendous leadership efforts. We would like to thank the student participants, their mentors, and the many individuals who have helped to organize this symposium. It has been a great team effort.

A special thanks is also extended to Ruthi Duval and Nancy Kujak-Ford of The Wisconsin Union; Andrea Benton and Melissa Tedrowe of the Writing Center; Nancy Brower, Tricia Dickinson, Linda Kietzer, Nancy Rinehart, and Nick Weaver, at University Communications; Mike Tessmer of the Division of Information Technology; and Jennifer Gulig Klippel of the La Follette School of Public Affairs.

2005 Undergraduate Symposium Organizing Committee:

Andrea Benton, Jane Harris Cramer, Tricia Dickinson, Laurie Mayberry, Alan Paberzs, Virginia Sapiro, Akua Sarr, Melissa Tedrowe, Randy Wallar

Cover photos by Michael Forster Rothbart and Jeff Miller, Office of University Communications

Student	Major	Mentor(s); Department	Student	Major	Mentor(s); Department
Abdul, Khalid Agoada, Joseph	Biochemistry Communication Arts	Jamey Weichert; Radiology Ann Lundin; School of Library and Information Studies	Brown, Claire Bruggink, Sean Burks, Dominic Butzlaff, Erick Cahill, Nicole Chagolla, Regina	Sociology, Women's Studies Biochemistry Wildlife Ecology Mathematics, Physics, Astronomy Undeclared Elementary Education	Myra M. Ferree; Sociology James Ntambi; Biochemistry Jason Jackson Gross; Wildlife Ecology Roummel Marcia; Biochemistry Chuck Kalish; Educational Psychology Marianne N. Bloch; Curriculum and Instruction Ed Churchwell; Astronomy Soumya Srinivasan; Civil and Environmental Engineering Stefanie Halverson; Communication Arts Cynthia Carlsson; Geriatrics and Adult Development
<i>Team project</i> Albiero, Bridget Struve, Gretchen	Art Sociology	Elaine Scheer; Art	Chang, Mai Chen, Sophia	Engineering Mechanics Chemical Engineering	William Bement; Zoology
Amodeo, Amanda Anderson, Hannah Communication Anderson, Rachel	Genetics Undeclared Nursing	A. Leonardo Inquez; Agronomy Ellen Thompson; Life Sciences Pamela Kling; Pediatrics	Chokdee, Darin Clark, Zachary	Pre-Pharmacy Biochemistry	
<i>Team project</i> Azad, Namita Jones, Stefanie Kuo, Joseph	Biology Undeclared Medical Microbiology and Immunology	Nihal Ahmad; Dermatology	<i>Team project</i> Clark, Andrew Wong, Kara	Biology Chemistry	
Baalbaki, Zaynab	Elementary Education	Gloria Ladson-Billings; Curriculum & Instruction	Clements, Adam Condon, Colleen Cooke, Melissa Coonen, Melissa Curtis, Laceasa Dale, Lucy Daniels, Erran Danielski, Angie Davies, James Davis, Zineb Delgado, Sara Derus, Sarah Dewi, Diana	Undeclared Social Welfare Art History Political Science Nursing Undeclared Pre-Elementary Education Biology Genetics International Studies Undeclared Biology Apparel Design	David Baum; Botany Susan Kidd Webster; Social Work John Hitchcock; Art Gary Sandefur; Sociology Linda Oakley; Nursing Eric Knuth; Curriculum & Instruction Eric Knuth; Curriculum and Instruction Mari Palta; Population Health Science Bermans Iskandar ; Neurological Surgery Tamir Moustafa; Political Science Mary Beltran; Chicano Studies Stuart Wooley; Entomology Diane Sheehan; Environment, Textile and Design
Bader-Natal, Danya Ballering, Nick Banerjee, Indrani	Anthropology Undeclared Molecular Biology	Maria Lepowsky; Anthropology Jean Bahr; Geology and Geophysics Arthur Polans; Ophthalmology and Visual Sciences	Dickey, Benjamin Drews, Rebecca Drutchas, Alexis	Undeclared Russian Literature History of Science	Robert West; Chemistry Adam Nelson; Educational Policy Studies Jane McElroy; Comprehensive Cancer Center
Becklund, Kristen Beier, Kevin Berg, Matthew Berg, Kathryn Berry, Raven	Biology and Spanish Chemistry English English Legal Studies	Robert Goodman; Plant Pathology Stephen Loukin; Molecular Biology Emily Hall; English Rob Nixon; English Jennifer Augus; Textile Arts	Duvnjak, Petar Edgar, Byron Ehlers, Kimberly Ehlers, Susanna	Biochemistry Engineering Nursing Undeclared	Brian Fox; Biochemistry Douglas Montequin; Surgery Diane Lauver; Nursing Tracey Holloway; Gaylord Nelson Institute for Environmental Studies Erik Doxtader; Communication Arts
<i>Team project:</i> Bertling, Kristen	Genetics, Bacteriology, Women's Studies	Anne Enke; Women's Studies	Emberley, Christina	International Studies	Erik Doxtader; Communication Arts
Evenstone, Amanda	Biology, Psychology, Women's Studies		<i>Team project</i> Enters, Lindsay	Social Work	Gerry Campbell; Agricultural and Applied Economics
Stoecker, Leah	Political Science, History, Women's Studies		Mergen, Rebecca	Economics	
Betancourt, Cristina Bethke, Lynn Bhargava, Akansha	Molecular Biology Anthropology Genetics	Yoshiro Saimi; Genetics Sissel Schroeder; Anthropology Craig Atwood; Geriatrics and Adult Development	Estante, Sophia Eun, Ye Jin Ezcurra, Jenelle	English and Journalism Biochemistry Communicative Disorders	Emily Hall; English Silvia Cavagnero; Chemistry Kimber Malmgren; Rehabilitation Psychology & Special Education Karl Shoemaker; History Wei-Yin Loh; Statistics
<i>Team project:</i> Bichler, Allison Swenson, Annika	Biology Biology	Michelle Harris; Biology Core Curriculum	Feingold, Ellen Feng, Shiming	History Applied Math, Engineering and Physics	
Bichler, Allison	Biology	Michelle Harris; Zoology	<i>Team project</i> Funk, Jessica	Human Development and Family Studies Undeclared Human Development and Family Studies	Julie Poehlmann; Human Development and Family Studies
<i>Team project</i> Black, Hernan Glaser, Matt	Biology Pre-Pharmacy	Mark Brownfield; Comparative Biosciences AHABS	Jurowicz, Hannah Lesser, Heather		
Blaylock, Kohisha	Pre-Pharmacy	Robert San Juan; Human Development and Family Studies	Garcia, Dina	Bacteriology	Garet Lahvis; Surgery
<i>Team project</i> Bradsby, Jennifer Steckervetz, Lori	Wildlife Ecology Wildlife Ecology	Regina Hirsch; Entomology			
Brouwer, Marieka	Anthropology	Sissel Schroeder; Anthropology			

Student	Major	Mentor(s); Department	Student	Major	Mentor(s); Department
Gaudioso, Sofia	Psychology	Shelly Grabe; Psychology	Kapelke-Dale, Jessica	Nursing	Susan Zahner; Nursing
<i>Team project</i> Gerovac, Tiffany Turner, Nicholas	Biology (Neurobiology option) Biology (Neurobiology Option)	Daniel Resnick; Neurological Surgery	Kaul, Steven Kersh, Mariana Ketchum, Armena Kiedrowski, Megan	Biochemistry Mechanical Engineering English Medical Microbiology and Immunology Neuroscience	Brian Fox; Biochemistry Heidi-Lynn Ploeg; Mechanical Engineering James Danky; Journalism Joseph Dillard; Medical Microbiology and Immunology Joe Elder; Sociology
Gonzalez, Jason Gottula, Ryan	Legal Studies Cultural Anthropology	Dennis Dresang; Political Science Jonathan Mark Kenoyer; Anthropology	Kream, Jessica		
<i>Team project</i> Gratz, Eli Haphuriwat, Naraphorn Magua, Wairimu Wierzbicki, Kevin	Industrial and Systems Engineering Industrial Engineering Industrial Engineering Electrical and Computer Engineering	Vicki Bier; Industrial and Systems Engineering	<i>Team project</i> Kressel, Lucas Olson, Ashleigh	Biology Biology	Eugene Kaji; Cardiovascular Medicine
Grundahl, Lydia Gsell, Katherine Guettler, Anne Gurnee, Emily Haertel, Andrew Hagen, Jessica Harrison, Colin Hasan, Ayesha Heaton, Nicholas	Chemistry History and History of Science Journalism and Mass Communication Biochemistry Zoology Interior Design Genetics Biochemistry Bacteriology	Lauren Trepanier; Medical Sciences Victor Hilts; History of Science Lyn Macgregor; Sociology Hasan Mukhtar; Dermatology Daniel O'Brien; Zoology Mark Nelson; Environment, Textiles and Design Hasan Khatib; Dairy Science Doug Montequin; Surgery Randal Wolff; General Surgery	Kriplean, Travis Kriplean, Travis Krukowski, Tammy Lai, Tsz Chung	Computer Science Sociology Women's Studies Genetics	Robert Meyer; Computer Science Daniel Kleinman; Rural Sociology Virginia Sapiro; Women's Studies Amy Charkowski; Plant Pathology
<i>Team project</i> Heideman, Paul Lehmann-Ziebarth, Nicolas Shapiro, Rebecca Stephenson, Gordy Stoddart, Sonia	Mathematics Economics Mathematics Mathematics Biology	Anthony Ives; Zoology	<i>Team project</i> Lammi, Kimberly	Business Marketing	Denise St. Clair; Journalism & Mass Communication
<i>Team project</i> Hillary, Anna Taibleson, Benjamin	Political Science Political Science	Kenneth Goldstein; Political Science	Lelkes, Yphtach Peczerski, Patrick Teo, Jerilyn	Journalism International Studies Journalism	
Hirsch, Liza Hirschtritt, Zachary Hoegger, Mark	Psychology Biological Aspects of Conservation Biochemistry	Janet Hyde; Psychology Theodore Anchor; Horticulture Leonard Levin; Ophthalmology and Visual Sciences	<i>Team project</i> Lang, Natalie	Human Development and Family Studies: Child Development Human Development and Family Studies: Child Development	Julie Pochlmann; Human Development and Family Studies
Howe, Mark	Biology	Lew Haberly; Anatomy	Williams, Andrea		
<i>Team project</i> Hunt, Stephen Isely, Kim	Biochemistry Medical Microbiology and Immunology	John Ferrick; International Agriculture Programs	Le, Nghia	Electrical Engineering	Xiaozhao Lu; Civil and Environmental Engineering
Klink, Jenna Means, Alex	Biology Genetics		Leaver, Kelly Lee, Princess Lehner, Joseph Leonard, Timothy Leung, Lydia Li, Pui Lichtenheld, Adam	Biochemistry Biology and Women's Studies Anthropology Comparative Literature Pre-Pharmacy Linguistics Political Science	Ed Churchwell; Astronomy Charles Kalish; Educational Psychology Jonathan Kenoyer; Anthropology Linde Brady; Art History Barbara Schneider; Nursing Marlys Macken; Linguistics Aili Mari Tripp; Political Science & Women's Studies
<i>Team project</i> Hussain, Muzammil	Journalism and Mass Communication	Douglas McLeod; Journalism and Mass Communication	Liu, Jenny Lomax, Joelle	Biochemistry Molecular Biology	Carl-Erik Tornqvist ; Genetics Jane Harris Cramer; Center for Biology Education
Mogahed, Mona	Communication Arts		Lor, Kajua Lukas, Kristie	Pharmacy Applied Math, Engineering and Physics	Marlys Macken; Linguistics Patrick Krysan; Horticulture
Igoni, Adienamikiphe Intermont, Vivian Jackson, David Jones, Kristen Kabara, Edward Kaelin, Lisa	Biological Sciences Legal Studies and Political Science Secondary Math Education Physics Biochemistry Human Development and Family Studies	Robert Blank; Endocrinology Pamela Oliver; Sociology Dennis Dresang; Political Science Peter Timbie; Physics Alan Attie; Biochemistry Julie Pochlmann; Human Development and Family Studies	Mahuta, Hana	Comparative Literature, Economics, Japanese	Victor Bascara; English and Asian American Studies
Kallio, Julie Kalnicky, Emily	Biology Zoology, Spanish, and Psychology	Michelle Harris; Biology Core Curriculum Janette Boughman; Zoology	Martin, Kaitlin Martinez, Kevin Marvitz, Jennifer	Biochemistry Biomedical Engineering Economics	Ajit Verma; Human Oncology Aji Djamali; Nephrology Craig Atwood; Geriatrics and Adult Development
			McChesney, Shannon Meyer, Matthew Michl, Lisa Miller, Christopher Minkoff, Michael Mohr, Jennifer	Biology Wildlife Ecology Zoology Biochemistry Philosophy Human Development and Family Studies	Mark Brownfield; Comparative Biosciences William Karasov; Wildlife Ecology Charles Snowdon; Psychology John Frey III; Family Medicine Harry Brighthouse; Philosophy Jon-Paul Bianchi; Human Development and Family Studies
			Mortezazadeh, Camellia Nesse, Sonja	Political Science Textile and Apparel Design: Apparel Focus Political Science	Dennis Dresang; Political Science Anna Stevens; Environment, Textiles and Design Heinz Klug; Law School
			Nur, Amina		

Student	Major	Mentor(s); Department	Student	Major	Mentor(s); Department
Oda, Ohan Oliver, Kyle	Computer Engineering Nuclear Engineering	Stephen Chenney; Computer Science Laura Grossenbacher; Engineering Professional Development	Stieg, Anna Stokstad, Ingrid Tamez, Michelle Teh, Wen	International Studies International Studies Wildlife Ecology Chemical and Biological Engineering	Svetlana Karpe; Student Academic Affairs Orfeo Fioretos; Political Science Jackson Gross; Wildlife Ecology Padma Gopalan; Material Science and Engineering
O'Neil, Tyriina Orth, Jennifer Packiam, Vignesh Patel, Sarang Pauer, Susan Perez, Jose Perron, Elizabeth Peterson, Abigail Pletcher, Riamsalio Pitterle, Amanda Powers, Emily	Biochemistry Nursing Biology Undecided Biology Chemical Engineering Biology Political Science Biochemistry Biochemistry Nursing	Robert Blank; Endocrinology Karin Kirchhoff; Institute on Aging Lynn Haynes; Surgery Lynn Haynes; Surgery Carolina Penalva; Zoology Leanne Vigue; Zoology Barbara Schneider; Nursing Byron E. Shafer ; Political Science Christopher Schwartz; Biochemistry Que Lan; Entomology Sue Heidrich; UW Comprehensive Cancer Center	Thao, Mai Truong, Jonathan Tully, Katherine Valle, Eder Viana, Alex Vinarsky, Victoria Wan, Elias Wang, Xuan	Physician Assistant Biology Latin American, Caribbean, and Iberian Studies Chemistry Physics, Astronomy/Astrophysics Psychology Undecided Biochemistry	Su-Min Chang; Internal Medicine Art Glenberg; Psychology Gerry Campbell; Agricultural and Applied Economics Michael Stevens; Botany Eric Wilcots; Astronomy Diane Gooding; Psychology W. John Haynes; Laboratory of Molecular Biology Cynthia Carlsson; Geriatrics and Adult Development
Prahl, Lili Pyatskowitz, Andrew Ray, Amrik Raymond, Kara Rea, Jason	Undeclared Economics Biochemistry Biological Aspects of Conservation Undecided	Jackson Gross; Wildlife Ecology Charles Hatcher; Consumer Science Nita Sahai; Geology and Geophysics Eileen Cullen; Entomology Alissa Minor; Wisconsin Center for Education Research	Wentland, Andrew Wochinski, Abby Wojcechowskyj, Jason Wong, Evera Wunnicke, Aaron	Biomedical Engineering Biochemistry Medical Microbiology and Immunology Biochemistry Forest Science	Thomas Grist; Radiology Brian Fox; Biochemistry Stacey Schultz-Cherry; Medical Microbiology and Immunology Hector DeLuca; Biochemistry Christopher Lepczyk; Forest Ecology and Management
Ries, Danielle Ringstrom, Eva Rodriguez, Christian	Genetics English Literature Political Science	Molly Carnes; Medicine John Tiedemann; English Kimberly Dadisman; Wisconsin Center for Education Research	Xie, Yang Xiong, Mai Lee Yang, Thae Yatzeck, Melissa Zaman, Najia Zaremba, Amanda Zechlinski, Brianna Zewdie, Selamawit Zhang, David	Biology Genetics Biochemistry Biochemistry and Chemistry Genetics Art Biology Psychology Biochemistry	Steven Shelton; Psychiatry David Baum; Botany Robert Blank; Endocrinology Ronald Raines; Biochemistry Mukhtar Hasan; Dermatology John Tiedemann; English Warren Porter; Zoology Stefanie Halverson; Communication Arts Judith Humphries; Parasitology
Rodriguez, Yaribel Rogers, Abigail Romanski, Sara Rosales, Adriana Rosario, Jade Rosu, Simona Rowland, Jennifer Rozumalski, Jason Rushmer, Erin Saeed, Sarah Sanford, Theo Sauer, Julie Schiesher, Rachel Schiro, Adam Schlieve, Christopher	Physician Assistant women's studies Nursing Biology Undecided Biochemistry Molecular Biology History Political Science Biology Genetics Biomedical Engineering Biochemistry Biochemistry Neuroscience	Susan Riesch; Waisman Center Virginia Sapiro; Women's Studies Susan Riesch; Academic Affairs Betty Chewing; Pharmacy Audrey Tluczek; Psychiatry Michael Cox; Biochemistry Catherine Fox; Biomolecular Chemistry Jean Lee; History Katherine Cramer Walsh; Political Science Mark Brownfield; Comparative Biosciences Laura Saunders; Family Medicine Lee Kaplan; Orthopedics and Rehabilitation Janet Batzli; Biology Core Curriculum F. Michael Hoffmann; Oncology Leonard Levin; Ophthalmology and Visual Sciences			
Schmidt, Brian Schowalter-Hay, Ethan Silberman, Lauren Simon, Kathleen Simpson, Keisha	Biology Wildlife Ecology English Neurobiology Pre-Pharmacy	Paul Sondel; Human Oncology William Karasov; Wildlife Ecology Kurt Squire; Curriculum and Instruction Bermans Iskandar; Neurological Surgery Karen Moriello; Medical Sciences			
<i>Team project</i> Smith, Ashley Stuckmann, Amanda	Nursing Nursing	Linda Oakley; Nursing			
<i>Team project</i> Smith, Whitnee Zepeda, Rebecca	Legal Studies Political Science and Portuguese	Kathryn Sanchez; Spanish and Portuguese			
Soundarrajan, Malini Sours, Christina Spencer, Sean Sprangers, Ashley Steinmetz, Matthew	Biomedical Engineering Art History Medical Microbiology and Immunology Sociology Biology	Curtis Olson; Continuing Medical Education Jill Casid; Art History David Watkins; Pathology and Laboratory Medicine Kathleen Todar; Social Work Jill Kolesar; Oncology			

BEAUTY FROM ASHES: FAITH-BASED SEXUAL ASSAULT AWARENESS AND HEALING PROJECT

Melissa Coonen and Gary Sandefur (Mentor), Sociology

The project “Beauty From Ashes” is a collaboration with Dane County’s Rape Crisis Center, Dr. Gary Sandefur, and myself to offer survivors of sexual assault a faith-based outlet to promote healing and support, while also educating faith-based leaders and the community on issues surrounding sexual assault. The faith community was targeted to reach out to victims through its strong relationship with women, minorities, and immigrants, who are all high-risk groups. Throughout the project, I implemented a sexual assault educational series, instructing in counseling and in strategies for detecting child abuse; this series aimed to create an atmosphere of awareness and prevention. I also focused attention on adult victims of sexual assault by producing a faith-based support group manual, giving survivors a faith-based option for healing.

ATHLETES’ USE OF VIDEO GAMES TO MEDIATE THEIR PLAY: COLLEGE STUDENTS’ USE OF SPORT VIDEO GAMES

Lauren Silberman and Kurt Squire (Mentor), Curriculum and Instruction

This qualitative research includes ethnographic interviews, participant observation and video and audio tape analysis. The research examines Mario Tennis to better understand the learning that takes place in “sport” video games. The study also shows how college athletes use “sport” video games to mediate their real sport play and learning. The various aspects explored are the specific skills “sport” games incorporate, the difference in learning between athletes and non-athletes who play “sport” video games and the values and skills the game teaches that may affect real playing. We are finding that sport video games support learning; we hope to find how one can improve real world sport skills by playing the sport video game counterpart.

**MAKING THE ABSTRACT IMAGINABLY CONCRETE:
EMBODIED KNOWLEDGE OF SPACE,
THE POLITICAL, AND GENDER**

Kathryn Berg and Rob Nixon (Mentor), English

This project explores how individuals understand and express three abstract concepts—space, the political, and gender—through concrete acts of the body. In other words, it examines the ways humans acquire “embodied knowledge” by approaching big ideas through physical actions. In an increasingly disembodied world, it’s crucial to remember that we don’t learn and communicate only with the mind and the pen, but also through tangible means: dancing, performing, and walking, to name a few. This interdisciplinary research draws upon secondary sources in body theory, dance studies, performance art, geography and gender studies, as well as primary sources such as artists’ statements, dance performances and personal interviews. The results of this project are as diverse as its subjects; each bodily translation offers another conclusion.

**A CHICKEN AND EGG STORY:
DOES A POLYPEPTIDE FORM BETA SHEET
BEFORE OR AFTER IT AGGREGATES?**

Ye Jin Eun and Silvia Cavagnero (Mentor), Chemistry

Protein folding and misfolding are closely related to several deadly disorders, including Alzheimer’s and Parkinson’s disease. A better understanding of these processes is critical in developing treatments and diagnostic assays. In this project, Sperm whale apomyoglobin and its fragment (1-77) were used to probe the presence of folded and misfolded molecular shapes. While the full length apomyoglobin is known to be stable, the 1-77 fragment aggregates and forms a characteristic conformation known as beta-sheet. This investigation involves the use of fast mixing devices to follow polypeptide folding and misfolding in real time by circular dichroism, fluorescence emission and fluorescence anisotropy. Our experiments are aimed at testing the hypothesis that formation of beta sheet may precede, and perhaps even trigger, the self-association of the protein.

**A COMPARISON OF LUCIFERASE EXPRESSION LEVELS
IN PQE AND PET VECTORS USING
AUTO-INDUCTION MEDIUM**

Petar Duvnjak and Brian Fox (Mentor), Biochemistry

The pQE and pET protein expression vectors are widely utilized in the expression of recombinant proteins in *Escherichia coli*. The UW Center for Eukaryotic Structural Genomics utilizes both types of vectors; however, there is no unambiguous understanding of the effectiveness of one system relative to the other. By comparing results obtained from expressing the gene for luciferase in two types of these expression vectors, we intend to develop a quantitative understanding of the expression characteristics of both systems. By using firefly luciferase as the expression target, we can utilize luminescence spectroscopy as an effective means for quantification of protein expression following growth in various expression hosts grown using different media formulations. Results of the comparative studies of pQE and pET vectors will be presented.

**A LITHIC COMPARISON OF
TWO ADJACENT ARCHAEOLOGICAL SITES**

Lynn Bethke and Sissel Schroeder (Mentor), Anthropology

This research examines the relationship between two archaeological sites in Dane County—47DA96 (known as Skare) and 47DA474—by analyzing lithic debitage collected at each. These two sites are both located near the Yahara River and today are separated by a road. They are, however, situated at different elevations. By examining the assemblages of lithic debitage—waste flakes created during the making of stone tools—and comparing certain characteristics such as raw material and heat treatment, it may be possible to determine if the two sites were occupied by similar peoples or if different kinds of activities were carried out at each. This project provides a glimpse into settlement preferences of ancient peoples in Wisconsin and can help researchers to better understand other features of spatially related sites.

A MOLECULAR MECHANISM FOR INHIBITION OF CELL DEATH IN UVR-INDUCED SKIN CANER

Kaitlin Martin and Ajit Verma (Mentor), Human Oncology

Ultraviolet radiation (UVR) exposure is the most important risk factor for human squamous cell carcinoma (SCC), a major non-melanoma skin cancer, because it causes DNA damage and increased proliferation of the skin. Previously, we found that overexpression of protein kinase C epsilon (PKCepsilon) in the skin sensitizes mice to the development of SCC by repeated exposure to UVR. PKCepsilon transgenic mice exhibit reduced cell death (apoptosis), which may correlate with increased survival of cancer cells. The Fas pathway is known to play a role in the elimination of DNA-damaged cells by apoptosis. We now present that expression of Fas-associated death domain (FADD) is lost after PKCepsilon mice are exposed to UVR, indicating a possible mechanism for the reduced cell death in skin cancer.

A NEW APPROACH TO ALZHEIMER'S DISEASE

Akansha Bhargava and Craig Atwood (Mentor),
Geriatrics and Adult Development

Neurons in the adult brain are mostly terminally differentiated cells that have exited the cell cycle. However neurons in the affected regions of the brain of Alzheimer's disease patients show numerous signs of aberrant reentry of neurons into the cell cycle (e.g. endoreduplication, mitochondrial biogenesis, tau phosphorylation, amyloid deposition), leading to cell death. The protein Necdin is expressed exclusively in terminally differentiated neurons and its function is thought to keep neurons in the terminally differentiated state. The aim of this study is to determine if the expression of Necdin is altered in the AD brain compared with the age-matched control brain, and whether this is correlated with the reentry of neurons into the cycle cell. We will test this immunocytochemically using antibodies specific to Necdin and cell cycle markers. If Necdin expression is decreased in the AD brain it will provide further support that differentiated neurons are re-entering the cell cycle.

ABC MODEL: CONTROLLING THE IDENTITY OF PLANT ORGANS

Mai Lee Xiong and David Baum (Mentor), Botany

In a classical research study done by Enrico S. Coen and Elliot M. Meyerowitz, they proposed an ABC model to explain floral development. The regulatory functions A, B, and C determine the identity of the organs. In a typical flower, its organs are arranged by four whorls: sepals in the first whorl (A-function), petals in the second (A+B), and then stamens (B+C), followed by carpels (C). The plant I am working on is a cultivated variety of *Hibiscus rosa-sinensis* that lacks stamens and carpels, which we hypothesized is mutant for the C-function gene, *AGAMOUS*. We set out to test the applicability of the ABC model to *Hibiscus* by comparing this mutant variety with a wild-type *Hibiscus* flower. We extracted the RNA from the wild type and mutant plants. We will attempt to amplify the *AG* gene from this RNA to see if the gene is expressed in both flowers. We will also sequence the gene to see if it is functional. So far, we have not obtained a conclusive result.

ACTION PATTERNS AND THEIR CONTRIBUTIONS TO LANGUAGE

Jonathan Truong and Art Glenberg (Mentor), Psychology

This project attempts to examine the relationship between action and language understanding. Three experiments were conducted and participants were asked to judge if a sentence was normal (e.g., the bear is brown) or odd (e.g., the bear has a handle.) The "normal" response was on the left for half of the time and the right for others. Furthermore, the object named in the sentence (e.g. a toy bear) was on the left or on the right. The participants responded faster when an object was placed on the same side as the correct response, thus demonstrating a relationship between action and language understanding. In the future, the information gained from this experiment could be used to increase reading comprehension and other language skills.

EFFECTS OF VARYING DEGREES OF FOLIC ACID SUPPLEMENTATION ON GLOBAL METHYLATION IN ADULT RATS

Kathleen Simon and Bermans Iskandar (Mentor), Neurological Surgery

The goal of this project is to confirm a dose dependent response of global methylation to folic acid supplementation. To do so twenty-eight Sprague Dawley rats were given treatments of varying folic acids concentrations via intraperitoneal injections ranging from 0 μ g/kg-800 μ g/kg beginning three days before injury and continuing daily until four days following the injury. The rats were subjected to a C3 dorsal column injury, followed by DNA extraction and purification. A global methylation assay was then performed. The assay revealed a dose-dependent response to folic acid supplementation in an inverse parabolic curve, with 80 μ g/kg being most effective. For clinical application, future studies would need to be performed to determine the underlying mechanism of the contributions of folic acid to methylation status and neuron regeneration.

AFTER-SCHOOL EXPERIENCES: A REFLECTIVE NARRATIVE ON BEST PRACTICES

Christian Rodriguez and Kimberly Dadisman (Mentor),
Wisconsin Center for Education Research

The current study explores Best Practices in after-school activity research. The study employs reflective and narrative inquiry as well as quantitative measures in examining the theory and implementation of Best Practices in after-school activities from the perspectives of researchers, practitioners and student participants of a middle school yearbook club. It is hypothesized that descriptions of high-quality after-school activities provided by practitioners and participants map onto those stipulated by theory and research. Practitioners and participants were interviewed to determine their understanding of high-quality activities and responses were compared to theoretical definitions of Best Practices. Observations were used to assess the extent to which Best practices are implemented within the yearbook club. Findings will serve to inform and validate current research of Best Practices in after-school activities.

AGONIST INDUCED HYPERTROPHY IN CULTURED NEONATAL MOUSE CARDIAC MYOCYTES

Lucas Kressel, Ashleigh Olson and Eugene Kaji (Mentor),
Cardiovascular Medicine

Successful studies involving agonist induced hypertrophy in cardiac rat cells have prompted us to attempt similar research on mice due to the abundance of genetically altered species. In this study, we devised a method of culturing mouse cardiac myocytes where there is agonist dependent hypertrophy. Isolating the cardiac myocytes involves harvesting the neonatal mouse hearts, splitting the tissue into individual cells by enzyme agitation, and plating the cells in Serum-free plating medium. Once isolated, the myocytes are introduced to T3 agonist, which has produced hypertrophy as far as sarcomeric organization. To further analyze the extent of hypertrophy, we will study agonist effects on cardiac myocyte size and mRNA expression, and eventually test this procedure on knock-out mice. Such induced positive hypertrophy is a promising concept for treatment of heart disease.

ALCOHOL USE DISORDERS & TELEPHONE AND MAIL INTERVENTION (TAMI)

Theo Sanford and Laura Saunders (Mentor), Family Medicine

This research seeks to reduce alcohol consumption, health care utilization, and related costs for primary care patients with alcohol abuse or dependence. A randomized controlled total access trial is assessing the efficacy of a counselor-administered, telephone and mail intervention compared to a health life styles pamphlet. 22,500 patients have been recruited and systematically screened in 18 primary care and managed care clinics in Madison and Milwaukee, Wisconsin, to identify 900 subjects for the trial. The intervention included six 30 minute, structured telephone counseling sessions and post-session summary letters. Primary outcome measures, assessed at baseline 3-, 6-, 12 months, are total alcohol consumption and days of heavy drinking over the past 28 days. Preliminary data shows that telephone and mail intervention has significantly reduced drinking at 3 months.

ALUMINA-SILICATE FORMATION IN THE PRESENCE OF ALGINIC ACID, SILICON, AND VARYING TEMPERATURES

Amrik Ray and Nita Sahai (Mentor), Geology and Geophysics

Clay is composed of complex alumina-silicates. Formation of a specific clay, Kaolinite ($\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$), is the object of this study. Laboratory-derived mechanisms for forming Kaolinite occur at an unnaturally low pH and slow rate. Previous research suggests that complex organic molecules may catalyze the formation of Kaolinite. This research will determine the effects of Alginic Acid, a bacterial polysaccharide; Silicon; and variations in temperature on Kaolinite formation. Aluminum concentration and pH will be held constant for all solutions and precipitates will be examined using high-resolution transmission electron microscopy for the presence of alumina-silicates. Filtered solutions will be passed through an inductively-coupled plasma mass spectrometer to identify the solutes. Through this study we should gain a better understanding of mechanisms that drive Kaolinite formation.

ANTENNAS FOR STUDYING COSMIC MICROWAVE BACKGROUND RADIATION

Kristen Jones and Peter Timbie (Mentor), Physics

The purpose of this research is to make observations about gravity and density fluctuations during a period in universal history called inflation, which is unobservable through standard efforts due to its opacity to light. To this end, we will investigate the polarization of the Cosmic Microwave Background (CMB), which stems from the inflationary perturbations. In this project, we examine the beam patterns of millimeter-wave antennas that will be used in building a microwave telescope. The basis of this telescope is bolometric interferometry, which allows for super sensitivity to deviations; this sensitivity, in turn, will provide accurate observations of the CMB. Projected results include greater comprehension of the origins of universal structure (such as galaxy distribution in space) and the beginning of the universe itself.

ANTHROPOGENIC EFFECT ON OZONE LEVELS AND AIR QUALITY IN WISCONSIN

Susanna Ehlers and Tracey Holloway (Mentor),
Gaylord Nelson Institute for Environmental Studies

If everyone rode the bus on dangerous ozone alert days, would a noticeable change in severity occur? Information does exist regarding the impact of long term emission reductions (mainly by industries), but to what extent a small change in everyday human activity, such as riding the bus or combining errands, can have on a single day's ozone levels has never been quantified. To determine these impacts, we utilize a theoretical "best case scenario" model, where daily emissions are reduced by a maximum, yet feasible, percentage based on current Wisconsin policies. By comparing this computer generated model with data from state-wide measuring stations, we can assess the effect that minor, isolated changes in human behavior have on daily atmospheric ozone levels.

ARTS DEVELOPMENT IN RURAL COMMUNITIES

Anne Guettler and Lyn Macgregor (Mentor), Sociology

This research investigates the production and development of art in rural areas and the impact that artistic production has on the economy and cultural vitality of the rural towns. Using internet resources, I survey rural communities that have demonstrated investment in the arts by creating performing arts spaces. I study case communities in four states to better understand how arts production is being promoted in these towns, and also whether or not these efforts bring creditable economic growth. The hypothesis of this research is that community investment in the arts may in fact bring more economic activity and opportunities for cultural creativity to rural America than was once thought.

ASPEN (POPULUS TREMUOLOIDES) DECLINE, CHEMISTRY AND ELK HERBIVORY IN UTAH

Sarah Derus and Stuart Wooley (Mentor), Entomology

Areas populated by elk appear to show a decline in the existence and appearance of Aspen clones. Aspen clone popularity may be a result of differences in the palatability of a clone, but it is unknown if this is true. Little investigation has been done to determine if differences in Aspen clone popularity is the result of differences in their chemistry, specifically in levels of condensed tannins and phenolic glycosides. I predicted that differences in chemistry between paired clones might explain differences in their palatability to local elk populations. I extracted and measured levels of condensed tannins and phenolic glycosides in Aspen leaves from central Utah. The measured levels of condensed tannins and phenolic glycosides between paired clones showed slight differences in their chemistry. Although there appears to be differences in palatability between paired clones, it apparently is not due to differences in phenolic glycoside or condensed tannin concentrations.

ASSESSING SOUTH AFRICA'S TRUTH AND RECONCILIATION COMMISSION

Christina Emberley and Erik Doxtader (Mentor), Communication Arts

This project explores the affects The Truth and Reconciliation Commission (TRC) is having on South African society, and how people have processed it through writing. The TRC gave victims and perpetrators of human rights abuses committed during the apartheid regime a rare opportunity to seek amnesty/forgiveness face to face. During the first semester I researched books, scholarly journals, memoirs, dissertations, and journalistic pieces written by a diverse range of authors. I found pieces in both the UW–Madison libraries and online. The second semester has given me the opportunity to look into the religious discourse involved in the TRC exhibited by its emphasis on forgiveness rather than retribution. I will primarily use Archbishop Desmond Tutu's writing and The Truth Commission Report to explore this issue.

ASSESSMENT OF MOLECULAR MODELS AS A TEACHING TOOL FOR BIOMOLECULAR STRUCTURE-FUNCTION RELATIONSHIPS.

Julie Kallio and Michelle Harris (Mentor), Biology Core Curriculum

Scientists agree that there is an important relationship between structure and function in biomolecules. In the Cellular Biology laboratory course in the Biology Core Curriculum, we have implemented the use of hand-held molecular models and the molecular imaging program Protein Explorer in order to facilitate student learning and application. Preliminary studies indicate that the models are effective in enhancing student understanding; further studies are in progress. Interestingly, students who had access to the models considered the Protein Explorer program to be more useful. Another assessment examines the level of sophistication at which students are able to relate biomolecular structure to function in their writing. We feel that our findings regarding the usefulness of these tools could benefit researchers and practitioners in both the education and biomolecular industrial communities.

BEHAVIORAL EFFECTS IN CHRONICALLY EXPOSED WESTERN CLAWED FROGS (XENOPUS TROPICALIS) TO CADMIUM

Michelle Tamez and Jackson Gross (Mentor), Wildlife Ecology

This study is the first to address the behavioral toxicity of cadmium (Cd) in the Western Clawed frog (*Xenopus tropicalis*). Our hypothesis tested that Cd exposed adult females would exhibit compromised behaviors including shorter reaction times in the presence of a predator, decreased appetite, and greater time spent surfacing. Animals were randomly distributed into four groups (control, 5.0mg/L, 2.5mg/L, and 1.0mg/L) and placed individually in 4 liter aquariums. Use of refugia, feeding behavior, and surfacing time for each animal were recorded and analyzed. Whole body and ovary distribution of Cd was also assessed.

**BEYOND THE CLASSROOM:
COMMUNITY AND NEIGHBORHOOD BASED
EXPERIENCE IN TEACHER EDUCATION**

Regina Chagolla and Marianne N. Bloch (Mentor), Curriculum and Instruction

Community and neighborhood based experience is an important component for the preparation of teachers in the School of Education. Through a Curriculum and Instruction course, first year elementary education teacher certification students are placed in community and neighborhood sites serving children from diverse backgrounds. This project focuses on the experiences of service learning by reviewing literature summaries to determine the effects of various experiences and interpretations on individuals in community—neighborhood settings and observing and analyzing the sites. This research will identify the importance of community, neighborhood based experience in teacher education, and how participating in such sites expands future teachers' experience, so that critical thinking can be recognized and developed as an educator.

**BIOCHEMICAL CHARACTERIZATION OF THE
STEAROYL-COENZYME A DESATURASE ENZYME**

Sean Bruggink and James Ntambi (Mentor), Biochemistry

Stearoyl-coenzyme A desaturase (SCD) is an enzyme catalyzing the placement of a cis-double bond at the $\Delta 9$ carbon of saturated fatty acids. Four isoforms of SCD exist in mice and two isoforms exist in humans, each regulating the ratio of saturated to monounsaturated fatty acids. Deviations in this ratio are implicated in numerous diseases including diabetes, obesity and cancer, suggesting SCD's importance in human health. To better understand each SCD isoform's part in metabolism, I have been involved in studies aimed at determining the substrate specificity of each isoform. Furthermore, I am currently building transgenic human SCD/GFP constructs to better characterize human SCD in vivo. With these constructs, both subcellular localization and protein stability will be determined for both human SCD isoforms.

**BIOMECHANICAL PERFORMANCE IN F2 INTERCROSS
BETWEEN HCB/13 AND HCB/14 MICE**

Tyriina O'Neil and Robert Blank (Mentor), Endocrinology

The causes of a fracture are dependent on the strength of the bone and the load to which it is subjected. Using an intercross between HcB/13Dem mice and HcB/14Dem mice, which have differing bone properties, we can relate various bone phenotypes to animal genotype. 345 F2 mice were sacrificed at 17 +/- 1 weeks and long bones dissected free of soft tissue for micro-CT examination and 3-point bend testing. We measured biomechanical performance by 3-point bend testing. The data were graphed as the load displacement curve and measurements of maximum load, structural stiffness, and energy to failure extracted. The next step of the project is calculation of tissue-level mechanical properties.

**BODY SIZE AND ITS ROLE IN SPECIATION OF
THREESPINE STICKLEBACKS (GASTEROSTEUS SPP)**

Emily Kalnický and Janette Boughman (Mentor), Zoology

Determining how new species arise has been a goal of evolutionary biology since Darwin's *The Origin of Species* (Darwin 1859). I investigated how differences in body size and female preference for body size can influence the reproductive isolation between sympatric species of threespine stickleback (*Gasterosteus spp*). The completed portion of my larger project examined whether body size is a trait sexually selected for by females in the marine ancestral form. This question is important for my larger question seeking to discover whether or not there is a female preference for body size that is different between the two freshwater species of sticklebacks—*limnetics* and *benthics*. Results indicate that there is not a significant female preference for male body size in the marine stickleback.

BREAKING ALL THE RULES: THE RISE OF POLITICAL PARTIES IN UGANDA UNDER PRESIDENT MUSEVENI

Adam Lichtenheld and Aili Mari Tripp (Mentor),
Political Science & Women's Studies

This project seeks to identify different political parties and pressure groups in Uganda and explore their growth during the increasingly oppressive regime of President Yoweri Museveni. Museveni, who seeks constitutional reform abolishing presidential term limits, has created a system in which only his National Resistance Movement is permitted to function freely. Other parties, which have been increasing in number in recent years, cannot operate at the local level. Coalitions of parties and political organizations have formed to oppose Museveni's bid for a third term in 2006. This research draws upon journal databases and Ugandan media outlets to construct a comprehensive data table of individual political groups. By examining the parties' origins, foundations, and contributions, this research promotes an understanding of Uganda's political and societal structure.

BUILDING A PARTNERSHIP: AN INTERNATIONAL FIELD PLACEMENT PROGRAM FOR THE SCHOOL OF SOCIAL WORK

Colleen Condon and Susan Kidd Webster (Mentor), Social Work

This project forms a partnership between the School of Social Work and the indigenous Sri Lankan development organization, Sarvodaya, to create an international field placement program, empowering social work students to learn within Sarvodaya. By working in collaboration with Sarvodaya leadership in Sri Lanka, field positions have been identified for students. A partnership mission and systems for coordination and evaluation will make the partnership meaningful for all. In the aftermath of the tsunami, this partnership supports Sarvodaya with volunteers, while strengthening the School of Social Work and providing invaluable learning experiences for students. This project intends to share resources and knowledge, enhancing and supporting the mission of students and Sarvodaya to create lasting social change and welfare for all.

CATEGORIZATION IN PRESCHOOL CHILDREN

Princess Lee and Charles Kalish (Mentor), Educational Psychology

Perseveration is a tendency to repeat a response to an experience in later situations where it's not appropriate. It is common for young children to persevere, however adults can as well. In a dimensional change card sort (DCCS) task, children are asked to sort cards by one of its two dimensions; color or shape. The children understand the card has two dimensions, but do not know how they apply once the game switches from color to shape or vice versa. Because of this they persevere. Philip Zelazo's Cognitive Complexity and Control (CCC) Theory suggests that children persevere because they have difficulty using complex hierarchical rules. We conjecture that by strengthening the salience of the two dimensions of the cards the children will persevere less. The results of this experiment will help us understand how children under the age of four change strategies in solving problems or completing different tasks.

CATS AND KITTENS SURVIVING DERMATOPHYTOSIS (RINGWORM)

Keisha Simpson and Karen Moriello (Mentor), Medical Sciences

My project is in the veterinary dermatology concentration. The project seeks to locate cats with the skin disease dermatophytosis (ringworm) in the humane society, so that they can ultimately be treated and adopted. This disease is important to study because it is zoonotic, which means that it can be spread and cause harm to humans. We collect spores that are encouraged to grow so that later we can look under a microscope and tell if ringworm is present on the animal. The growth process of these cultures takes about three weeks. Once ringworm bacteria has been recognized, we are able to take different strains of the disease and store them for a more in depth research of dermatophytosis.

CHANGES IN THE RESERVATION WAGE

Andrew Pyatskowitz and Charles Hatcher (Mentor), Consumer Science

This project seeks to determine how much and why a person's savings goals for retirement change. The larger goal is to improve the health and economic conditions of retired persons. When someone retires, they have a savings goal that they would like to meet in order to retire, also called the reservation wage or target wealth. Data for the years 1998 and 2000 taken from the Health and Retirement Survey website is analyzed using a statistical computing program called SAS. The data sets are combined to compare different numbers. Using this method, the research hopes to find what makes the reservation wage change, such as a spouse dying or a change in current wealth. The findings will help policy analysts improve conditions for the elderly.

CHARACTERIZATION OF FKH1 PROTEIN INTERACTIONS IN SACCHAROMYCES CEREVISIAE

Jennifer Rowland and Catherine Fox (Mentor), Biomolecular Chemistry

The Forkhead Homolog 1 gene (FKH1) from yeast encodes a transcription factor conserved among all eukaryotic organisms. In both yeast and mammals forkhead transcription factors play important roles in regulating transcriptional programs that control cell cycle progression. My goal was to learn more about the mechanisms that the yeast Fkh1p uses to control transcription and the cell cycle by identifying other yeast proteins that interact with Fkh1p. A yeast two hybrid screen identified several possible Fkh1p-interactors, including six proteins that were not essential for yeast viability. To study the genes encoding these proteins and their potential genetic relationship to the FKH1 gene I used a PCR strategy to delete them from the yeast genome and classical genetic approaches to test their genetic phenotypes.

CHEMOPREVENTIVE EFFECTS OF RESVERATROL IN SKIN CANCER CELL GROWTH: DOSE AND TIME DEPENDENT STUDIES

Namita Azad, Stefanie Jones, Joseph Kuo and Nihal Ahmad (Mentor), Dermatology

A possible method to manage cancer is 'chemoprevention,' the use of chemical agents to prevent, arrest, or reverse the process of cancer development. Previous studies have shown that resveratrol, a polyphenolic antioxidant present in grapes and red wine, possesses chemopreventive potential against cancer, but the mechanisms by which this occurs are not well understood. We looked at the effects of resveratrol, in 100nM to 10 μ M concentrations for 2-72 hours, on A431 and A253 skin cancer cells. Cell growth and viability were examined using the Trypan Blue exclusion assay, and we used the APO-BrdU TUNEL apoptosis assay. Effect of resveratrol on senescence was determined by measuring senescence markers, such as p16 and β -gal via Western Blotting. Resveratrol had a negative effect on cell viability in a dose and time dependent manner, and also effected cell growth. This project shows that the antioxidant resveratrol acts as a chemopreventive agent.

CLONING AND OVEREXPRESSION OF DELTA-9 DESATURASES IN SACCHAROMYCES CEREVISIAE.

Steven Kaul and Brian Fox (Mentor), Biochemistry

Stearoyl-CoA desaturase (SCD) catalyzes the rate-limiting step in the synthesis of monounsaturated fatty acids. Studies have shown that transgenic mice with a mutation in the SCD1 gene are resistant to diet induced weight gain despite increased food intake. There are four isoforms of SCD in *Mus musculus* and the physiological role of these enzymes is not currently understood. Heterologous expression and isolation of each SCD isoform will allow determination of substrate specificity and study of inactivation of each enzyme with sterculic acid. Three of the mouse SCDs have been amplified by PCR and cloned into the pYES-DEST52 expression plasmid. All three isoforms have been transformed into a yeast mutant, deficient of its native desaturase, and shown to be active and able to complement the mutation.

CLONING OF BIOMPHALARIA GLABRATA HEMOCYTE RECEPTORS THAT MAY BE IMPORTANT IN IMMUNE RESPONSES

David Zhang and Judith Humphries (Mentor), Parasitology

Schistosoma mansoni is a problematic parasite, infecting 200 million people worldwide. In addition to its human host, the parasite also infects the snail *Biomphalaria glabrata*. However, some snails are immune to *S. mansoni* infections because their blood cells, called hemocytes, detect and migrate to the threat to surround and kill it. We believe that the receptors and methods hemocytes use to communicate with their environment, play an important role in this defense mechanism. The aim of this project is to clone hemocyte receptors that might play a role in detecting pathogens, such as parasites, and initiating an immune response against them. In order to clone potential receptors, we are using a technique called Polymerase Chain Reaction (PCR).

COMBINED EFFECT OF ANTI-TUMOR AGENTS MITOMYCIN C AND IRINOTECAN: PHASE II

Matthew Steinmetz and Jill Kolesar (Mentor), Oncology

We are studying the effect of combining two chemotherapy drugs, Mitomycin C (MMC) and Irinotecan (CPT-11), when treating esophageal and stomach cancers. MMC increases the level of topoisomerase I (TOPO1), an enzyme that exists in all cells. CPT-11 inhibits TOPO1 and kills the cell. We propose that infusing CPT-11 24 hours after the infusion of MMC will make the drug more effective. I am measuring the expression level of TOPO1 during treatment with MMC in search of a correlation between TOPO1 levels and both tumor response and toxicity. We expect that combining these chemotherapy drugs will result in smaller doses, which will reduce side effects but increase efficiency.

COMMUNITY-BASED SEA TURTLE CONSERVATION IN LOS CABOS, MEXICO: AN EVALUATION OF AFFECTING FACTORS

Jennifer Bradsby, Lori Steckervetz and
Regina Hirsch (Mentor), Entomology

In response to the failures of traditional top-down conservation strategies in developing countries, scientists have adopted a more collaborative approach that integrates local residents to address local environmental problems. This grass-roots approach, known as community-based conservation, serves as the basis of this study, which looks to explore the socio-economic, cultural, and logistical aspects of a conservation project focused on the Olive Ridley sea turtle. This investigation was conducted during a site visit to a small fishing village in Los Cobos, Mexico. Students participated in activities related to sea turtle recover, as well as interviewing local stakeholders to assess how the sociological and economic characteristics of the community factors affect the conservation activities. We present summaries of the various factors affecting the success of this example of community-based conservation.

COMPARISON OF COLORECTAL CANCER INCIDENCE RATES IN WISCONSIN TO NATIONAL AND GLOBAL TRENDS

Alexis Drutchas and Jane McElroy (Mentor), Comprehensive Cancer Center

Colorectal cancer has the third highest incidence rate in the United States behind prostate and lung cancer for men and breast and lung cancer for women. Wisconsin incidence rates are slightly higher than the nation's. This project examines the geographic variation in age-adjusted colorectal cancer incidence by state and counties (n=72) of Wisconsin over a 20 year period (1980-2000). Comparisons are also made using US and International incidence trends. Incidence trends by sex and geographic location have important implications in the fields of public health and epidemiology, including presenting evidence for exploring etiology, generating strategies for disease control, and assessing the needs of the population for health care such as sigmoidoscopy screening tests.

COMPARISON OF ULTRASONIC MOUSE VOCALIZATION FREQUENCIES BETWEEN BALB-/CJC AND C57BL/6J MICE

Dina Garcia and Garet Lahvis (Mentor), Surgery

Mouse genetics may provide important clues to the etiology of Autism by understanding the ontogeny of social functioning in mice. This experiment focuses on the comparison of male and female interactions in BALB/cJ and C57BL/6J mice. During standard behavioral experiments, ultrasonic vocalizations, which are important for communicating during non-aggressive social interactions, are recorded. The data is converted to spectrograms for further analysis of the vocalizations. The ultimate goal is to find the optimal and efficient way of analyzing the data obtained from behavioral experiments. The proposed method can later be used to analyze the ultrasonic vocalizations of other strains. This will provide the normal behavior of diverse strains, which can later be compared to knockout mice to detect the possible genes related to autism.

CONSTRUCTING IDENTITY: HOW RACE, GENDER, AND CLASS AFFECT WOMEN

Sara Delgado and Mary Beltran (Mentor), Chicano Studies

This project will be a study of how race, gender, and class shape both Latina and Caucasian women's identities. The study will consist of a survey that is handed out to two groups. One group will be Latina women, the other will be Caucasian women. The groups will each have ten participants. The surveys will be confidential and will ask for information regarding age, race, hometown, and class. The questions will be a mix of formats, some multiple choice and others short answer. The study will hopefully uncover how identity is formed and influenced by multiple factors, and cannot be predetermined by race, class or gender alone.

COPING WITH THE BLUES

Ashley Smith, Amanda Stuckmann and Linda Oakley (Mentor), Nursing

In Wisconsin, African Americans face a heightened risk of developing cardiovascular disease (CVD) as well as greater mortality rates due to CVD. As nursing students, we have learned that psychological factors can have a large impact on physical health; therefore, our study, "Coping with the Blues", investigated the role of depression in the risk of developing CVD in African American adults and children. Physical risk of CVD was measured by blood

cholesterol levels, height, weight, Body Mass Index, and blood pressure. Stress, depression, and depression coping was measured by questionnaires. If our findings show a correlation between the increased risk of CVD and depression in African Americans, the data will be used to create community-based education interventions for African Americans living in Dane County.

CORN GROWERS' PERSPECTIVES OF WESTERN CORN ROOTWORM MANAGEMENT

Kara Raymond and Eileen Cullen (Mentor), Entomology

Corn growers have been able to manage the Western Corn Rootworm (WCR) by rotating corn with soybean, but recently a Variant WCR population has emerged in Southeastern Wisconsin with a behavioral adaptation that renders the corn-soybean rotation ineffective. In response Integrated Pest Management researchers have designed a field scouting protocol to determine where and to what extent the Variant WCR is present in Wisconsin. However, since the Variant WCR problem is so new to Wisconsin, farmers have not yet widely adopted the field scouting protocol. We administered a mail questionnaire survey to 213 corn growers across nine counties to determine grower knowledge about the Variant WCR and problems they had with the scouting protocol in order to design a protocol that better addresses the growers' needs.

CRAYFISH ECOLOGY ON THE LAKE MENDOTA DRAINAGE BASIN

Andrew Haertel and Daniel O'Brien (Mentor), Zoology

Crayfish Ecology on Lake Mendota Drainage Basin research is on Wisconsin Crayfish and non-native species. It documents the habitats of species in the Madison Area. Dan O'Brien has collected crayfish from their natural homes and burrows along the Yahara River, Lake Wingra, and streams around Madison. Size, location, species, sex, water samples, vegetation, and other information are documented. The data will be filled into a Geographic Information System (GIS) map of the Lake Mendota Drainage Basin. The result is a computerized map of the sites that crayfish prefer. *Orconectes rusticus* is a species of crayfish which was not observed in Wisconsin until the 1900s. As the species moves through Wisconsin, it displaces the native species of crayfish in the new home. The biodiversity of Wisconsin may be at risk. This project will bring awareness to the Madison community of the presence of invasive species.

CREATING A GENDER IMPACT STATEMENT

David Jackson and Dennis Dresang (Mentor), Political Science

The objective is to develop a Gender Impact Statement (GIS) for bills. A GIS is an extra attachment that will decide if a bill can be passed. Its main purpose is to bring women's awareness to the forefront bill making. Also, we are trying to find out how to publicize the statement, and who would fill the statement out, and govern, or judge, the statement. It is hypothesized that the GIS will improve equality of men and women during the drafting of bills. To test the hypothesis, our team had created a basic template of questions. Another method is the researching of New Zealand and Canada's Gender-Based Analysis templates, and using this data to develop our own GIS for Wisconsin, and put it into effect.

CROSSING THE LINE: WOMEN'S PATHS FROM CIVIL SOCIETY TO PUBLIC OFFICE

Claire Brown and Myra M. Ferree (Mentor), Sociology

This research examines female politicians' experiences in civic associations as a means of understanding the connections between non-political and political forms of civic engagement. I was specifically interested in the reasons women choose to enter electoral politics from a civil society background. My subject pool includes members of the Wisconsin State Senate, the Wisconsin State Assembly, and leaders in Madison area community organizations. Subsequent to a primary, quantitative portion of research, interviews were conducted with politicians and with local community leaders to flesh out the data. My findings support the hypotheses that civic associations are useful places to gain the kinds of skills and networks necessary for holding political office, and that civic associations are likely places from which to recruit potential female political candidates.

DAY, RESIDENTIAL AND JUVENILE CORRECTIONS SCHOOL PROJECT

Jenelle Ezcurra and Kimber Malmgren (Mentor),
Rehabilitation Psychology & Special Education

Increasing numbers of students with learning and behavioral disorders have been entering alternative schools, which place students in a learning environment that suits their particular needs. Unfortunately, however, little

information exists concerning the implementation of current education reform. During the past two years, my mentor and her colleagues sent out surveys across America to principals, and math, reading, and English teachers of students grades six through twelve in alternative settings. These surveys assessed four areas: curriculum, assessment, accountability policies, and instructional practices. We have begun entering survey data to analyze the alignment across teaching styles, illuminating how teachers respond to their students' needs. The goal of this research is to provide information that will benefit educators, school directors, and students alike.

DE LA TIERRA: OF THE EARTH

Sonja Nesse and Anna Stevens (Mentor), Environment, Textiles and Design

My goal for this project was to create a collection of clothing inspired by small moments of exquisite beauty within nature's rough extremes. For example, the burrowing Goldsmith Beetle is like a living golden gem, yet is only seen if it happens to be unearthed from the soil. I aimed to capture moments like this and make them large by reinterpreting them through each piece. Materials used are natural and synthetic beads and fabrics. Some of the fabrics are hand dyed. I feel that these pieces have a strong, roaming visual interest that evokes curiosity and makes them stand well as finished garments. In the end, however, it is the movement of the wearer that brings each creation to life.

DECONSTRUCTING CONVENTIONS: MODERNIST PORTRAITURE AND NATIONAL IDENTITY

Amanda Zaremba and John Tiedemann (Mentor), English

My project explores the ways in which national identity is formed through visual art and in writing; I am specifically interested in the genre of portraiture during the modernist period. I examine how conventional portraiture is used to create an "official" national identity and how, by contrast, the experimental portraiture of modernists in exile particularly Pablo Picasso and Gertrude Stein diverges from convention in order to create alternatives to the "official" national norm. Through a detailed analysis of specific portraits, I show how these artists contribute to both the construction and deconstruction of national identity.

DESIGN VISUALIZATION AS A COMMUNICATION AND MARKETING TOOL

Jessica Hagen and Mark Nelson (Mentor), Environment, Textiles and Design

Interior designers have the gift of being able to see and experience a conceptual design before construction even begins. Due to the fact that the designer is rarely the end user, communicating the initially intangible design to a client is where a project begins or ends, if the designers “vision” fails to be recognized. Technological advancements have changed the world of design, enabling computers to mimic reality. I created a comprehensive package that visually highlighted various aspects of a design through the use of AutoCAD, Autodesk VizRender, Adobe Photoshop, QuickTime, Adobe Premiere and Microsoft Power Point. Although a picture says a thousand words, numerous still images, PowerPoint, a multimedia video, a brochure and a dynamic AutoCAD model tell a story, and create an environment.

DETERMINING CHILDREN’S PERCEIVED PRINCIPLES OF OWNERSHIP AS THE STATUS OF THE OWNER CHANGES

Nicole Cahill and Chuck Kalish (Mentor), Educational Psychology

The purpose of this project is to gain insight into how children view ownership status. To do this we developed three hypothetical situations. Each situation juxtaposed two people with different ownership statuses: creator versus borrower of the object, creator versus buyer, and buyer versus borrower. In each situation, we identified five properties and asked the child which of the two people had the right to use or prevent the use of the object in the specified ways. These five properties include use as nonstandard function, changing the identity, modification, lending, and destruction. Children’s responses to the questions will be analyzed to reveal what rights children believe owners are entitled to depending on their ownership status.

DEVELOPING NATURAL COMMUNITY STANDARDS FOR THE “HEALTHY GROWN” ECO-POTATO LABEL

Zachary Hirschtritt and Theodore Anchor (Mentor), Horticulture

This research project is focused on creating the demonstration and education plots “Healthy Grown” potato growers will utilize to guide their own restoration efforts. The goal is to create and test natural community standards that will be included in the existing certification protocol of Healthy Grown. I have been assisting Ted Anchor, Ecosystem Coordinator for the

WWF/WPVGA/UW Collaboration, in conducting restoration activities on grower’s land including—collecting and spreading native seeds, controlled burning and non-native species removal. I will conduct interviews with participating farmers to assess their perception and interest in the restoration efforts and the Healthy Grown project to-date. This innovative project allows the consumer the option to pay for both environmentally friendly produce and natural community conservation by purchasing Healthy Grown.

DEVELOPMENT OF DETECTION METHODS FOR CLAVIBACTER MICHIGANENSIS

Tsz Chung Lai and Amy Charkowski (Mentor), Plant Pathology

This research seeks to isolate and identify the *Clavibacter michiganensis* subspecies. *Clavibacter michiganensis* subspecies contains plant pathogenic bacteria, which causes various plant diseases in the agriculture. Potato, tomato, pepper and eggplant are the agricultural products that this research project focuses on. Symptoms of the infection may not appear when the disease continues to grow within the potato. The isolation and amplification of DNA are done by DNA extraction, Polymerase Chain Reaction (PCR) with subspecies-specific primers. Gel electrophoresis, DNA sequencing and SSCP are used to identify the genes of the bacteria. Using the designed primer pairs it is possible to affirm the subspecies of *Clavibacter michiganensis*. This research will develop new and inexpensive technologies for detecting the *Clavibacter michiganensis* subspecies in the agricultural field.

DEVELOPMENT OF FLUOROGENIC PROBES FOR ASSAYING CYTOCHROME P450 ACTIVITY

Melissa Yatzeck and Ronald Raines (Mentor), Biochemistry

A novel probe has been designed to serve as a substrate for assaying Cytochrome P450 activity that incorporates fluorescent rhodamine and the “tri-methyl lock” concept. The fluorescence of the molecule remains suppressed until it is cleaved by the Cytochrome P450 enzyme, converting the probe to its fluorescent state. The probe possesses several unique advantages over current substrates, including potential new selectivity, higher sensitivity, ease of use, and modular capabilities. Synthesis and purification of this probe has been completed and its ability to serve as a suitable substrate for Cytochrome P450 has been assessed. If successful, the probe will provide researchers with a valuable new tool to evaluate Cytochrome P450 activity in the metabolism of drugs, toxins, and other compounds.

**DEVELOPING A CONTINUING
MEDICAL EDUCATION RESOURCE LIBRARY
USING THE DELPHI METHODOLOGY**

Malini Soundarrajan and Curtis Olson (Mentor),
Continuing Medical Education

The purpose of this study is to gather a list of books and journals, both print and electronic, for Continuing Medical Education (CME) professionals. The study utilizes the Delphi technique to compile such a list, which relies on the knowledge of a group identified 'experts' within the field. In a sequence of three surveys, the experts will gather a list of sources into and place them in one of the following seven categories: adult/organizational learning principles, educational interventions, performance measurement, systems thinking, partnering, leadership, administration/management, self-assessment and lifelong learning. The questionnaire allows participants to identify, categorize and rate specific books and journals. This study essentially establishes a comprehensive library filled with valuable resources recommended by a panel of experts to aid other CME professionals nationwide.

**DISTRIBUTION OF
ANGIOTENSIN RECEPTOR SUBTYPES IN RAT BRAIN**

Sarah Saeed and Mark Brownfield (Mentor), Comparative Biosciences

Angiotensin is a neuropeptide that participates in the regulation of blood pressure and salt and water metabolism. Angiotensin receptors can be found in the circulatory system, several glands and the brain. This study is being conducted to find the distribution of the specific receptors (AT1a, AT1b and AT2) in rat brains. Immunofluorescence is used to stain the brain tissue with specific antibodies against each receptor. These sites are then mapped using a rat brain atlas. Results will document where angiotensin exerts its effects on the brain. This determination will provide information that might suggest which particular drugs that act on selected receptors might be employed to treat angiotensin related diseases such as hypertension, stroke and renal disease.

DIVERSITY IN MATHEMATICS EDUCATION (DIME)

Zaynab Baalbaki and Gloria Ladson-Billings (Mentor),
Curriculum & Instruction

The purpose of this study is to understand the mathematical gap between white students and students of color, specifically in algebra, and the role teachers have in continuing the disparity. The study focuses on teacher education and professional development programs. The cross-college research is in collaboration with University of California–Los Angeles, the University of California–Berkeley, and University of Wisconsin–Madison and their allied school districts. The sites hold weekly videoconferences to critique literature on issues of diversity, equity, and mathematics education. We will change the field of mathematics education by producing qualified teachers. Through this research we hope to gain new knowledge, new resources, and a new generation of researchers and instructional leaders who are capable of making significant progress on issues of diversity and mathematics education.

**DIVING DEEPER:
VENTURING INTO SCIENCE WITH RURAL WISCONSIN**

Allison Bichler, Annika Swenson and Michelle Harris (Mentor),
Biology Core Curriculum

The purpose of this project, funded through a Wisconsin Idea Undergraduate Fellowship and supported by the Biology Core Curriculum, was to connect UW–Madison and rural high school science students in Wisconsin. We conducted in-class interactive presentations to introduce students to scientific research, to share our research on Red Bull energy drink, and to spark students' interest in science while opening their eyes to the opportunities at UW–Madison. We led students at Hayward and Wisconsin Heights high schools through an active exercise in which they designed their own experiments to test the human diving response (a set of physiological changes that occur when the face is immersed in cold water). Our project received strong positive responses from students and teachers, and Biocore has decided to continue sponsoring student Outreach Ambassadors in coming semesters.

**DOES RED BULL REALLY GIVE YOU WINGS?
THE EFFECTS OF CAFFEINE AND TAURINE ON
SHORT TERM MEMORY**

Allison Bichler and Michelle Harris (Mentor), Zoology

Energy drinks such as Red Bull have recently become extraordinarily popular amongst college students. We investigated the combined actions of Red Bull's two active ingredients, caffeine and taurine, on short term explicit memory. Individually, these two neuromodulators have been shown to improve memory, but their combined effect has not yet been investigated. In this double-blind study, college student subjects consumed either caffeine and taurine pills (in amounts equivalent to those in Red Bull) or a placebo, and then completed a memory assessment. Heart rate and blood pressure were monitored throughout the testing period. We found that the combination of caffeine and taurine in Red Bull has no effect on short term memory, but does cause a significant decline in heart rate and an increase in mean arterial blood pressure. The heart rate decline was unexpected and may have been caused by a taurine-induced increase in heart stroke volume.

**EFFECT OF FOLIC ACID PRE-TREATMENT ON
THE INTRINSIC REGENERATIVE PROPERTIES OF
CNS NEURONS**

James Davies and Bermans Iskandar (Mentor), Neurological Surgery

The Iskandar lab has previously shown that pre-treating rats with folic acid has a positive effect on their recovery following injury to the CNS. By culturing injured CNS neurons we hope to determine whether or not the regeneration of CNS neurons seen in vivo can also be shown in vitro. If the regenerative effects of folic acid can be reproduced in vitro it will show that the regeneration associated with folic acid is due to changes induced in the neuron itself. If on the other hand, the regeneration normally associated with folic acid in vivo are not shown in vitro it may be that the regenerative properties associated with folic acid are secondary to other effects, such as changing the activity of CNS helper cells.

**EFFECTS OF CADMIUM, CHROMIUM, AND LEAD ON
EMBRYONIC DEVELOPMENT IN XENOPUS TROPICALIS.**

Matthew Meyer and William Karasov (Mentor), Wildlife Ecology

Few toxicity studies have been directed at *Xenopus (Silurana) tropicalis*. Responses of *X. tropicalis* adults and embryos to heavy metals are unknown. We conducted FETAX assays exposing Neuwenkoop and Faber Stage 8 embryos to 5 doses of cadmium chloride, chromium trioxide, and lead nitrate ($n = 30$ embryos per treatment). Equal numbers of embryos were selected from a minimum of five proven breeders and randomly distributed among 35 six well culture plates. Embryos, with jellycoat intact, were monitored daily for 72 hours and mortality and developmental stages were recorded. At the conclusion of the study, all tadpoles were removed, euthanized, placed in formalin and analyzed for malformations. This is the first study to assess the lethality of heavy metals on *X. tropicalis* embryonic development.

**EFFECTS OF ELEVATED CO₂ AND O₃ ON LITTER
QUALITY: LIGNIN LEAF LITTER CHEMISTRY**

Jose Perez and Leanne Vigue (Mentor), Zoology

Elevated concentrations of CO₂ and O₃ are expected to have substantial impacts on ecosystem functions including nutrient cycling. These elevated atmospheric gases may indirectly alter ecosystem nutrient dynamics by changing plant leaf litter chemistry. Litter decomposition, an important component of nutrient cycling, is largely dependent upon leaf litter quality. Litter chemistry, specifically carbon to nitrogen ratios and lignin concentrations, is an important determinant of litter quality. The interactive effects of elevated CO₂ and O₃ on litter quality remain largely unexplored in the northern deciduous forest ecosystems. The purpose of this research is to investigate the independent and interactive effects of elevated atmospheric CO₂ and O₃ on litter quality in a northern deciduous forest ecosystem. The results from this research will increase our understanding of the effects of global climate change on ecosystem function, in particular, nutrient cycling.

EFFECTS OF HEAVY METALS ON RIBEIROIA ONDATRAE CERCARIAE

Ethan Schowalter-Hay and William Karasov (Mentor), Wildlife Ecology

Concerns over global amphibian population declines and amphibian malformations have prompted research into the effects of both pathogens and environmental contaminants. Pollutants have been shown to alter immune function in vertebrates contributing to the many possible hypotheses of population declines. The trematode parasite *Ribeiroia ondatrae* has been shown to be lethal and induce malformations in a number of amphibian species. This study examines the effects of five heavy metals commonly present in freshwater systems (aluminum, arsenic, chromium, copper, and lead) on the survival of *R. ondatrae cercariae* shed from wild-caught snail (*Planorbella tenuis*) hosts. Aluminum, copper, and lead significantly reduced survivorship of cercariae at ecologically relevant concentrations ($P < 0.05$). However, parasites survived long enough in all concentrations to conceivably find and infect potential amphibian hosts.

EFFECTS OF HEAVY METALS ON RIBEIROIA ONDATRAE MIRACIDIA

Lili Prael and Jackson Gross (Mentor), Wildlife Ecology

Disease agents and environmental pollutants have been implicated in global amphibian declines and in an increased prevalence in amphibian developmental malformations. Infestation by the trematode parasite, *Ribeiroia ondatrae*, has been shown to cause embryo mortality and developmental malformations in many amphibian species. This study examines the role of heavy metals on *R. ondatrae miracidia* development. Eggs collected from adult flukes were exposed to ecologically relevant concentrations of cadmium and miracidial development was observed until hatch. The information gained by studying the interaction between *R. ondatrae miracidia* development and environmental pollutants will elucidate the role of pollutants and trematode pathogens in amphibian malformations.

EFFECTS OF PHOSPHORUS ON ROOT DEVELOPMENT IN CORN

Amanda Amodeo and A. Leonardo Inquez (Mentor), Agronomy

This research seeks to find the physiological and genetic determinants responsible for the detection and subsequent responses to the essential nutrient phosphorus in corn plants. Very little is known about the effects of phosphorus stress at the gene expression level or the physiological events that transpire as a consequence of changes in gene expression in corn. Finding the manner in which the root structures respond to varying concentrations of the phosphorus will help us better understand the methods by which corn plants find and absorb nutrients. This will be done manipulating phosphorus availability to corn plants grown in hydroponics systems. We will then compare root structures and RNA expression patterns. The RNA will be used in microarray studies to correlate the genes expression changes with the observed changes in root structure.

EFFECTS OF POTENTIAL INTERFERING SUBSTANCES ON ZINC PROTOPORPHYRIN/HEME LEVELS IN WHOLE BLOOD

Rachel Anderson and Pamela Kling (Mentor), Pediatrics

Blood tests are critical for infant survival after a diagnosis of Anemia of Prematurity. Current tests for plasmal ferritin, transferrin saturation and hemoglobin require 3-5 ml of blood (up to 10% total volume), potentially worsening an infant's condition. Zinc protoporphyrin/heme (ZnPP/H) testing requires less blood. ZnPP/H levels increase as iron levels decrease. As bilirubin, insulin, and antibiotics can alter ZnPP/H levels, screening for these substances on ZnPP/H levels in human cord blood. Cord blood samples collected from 7-day old infants are combined with these substances and incubated at 37 degrees Celcius for 0, 3, 24 hours. Plasma is removed, blood wahed in saline solution (3x), removing pigments. Testing determines effects of substances on ZnPP/H levels.

ELUCIDATING FUNCTIONS OF RECEPTOR-LIKE KINASE IN ARABIDOPSIS

Jenny Liu and Carl-Erik Tornqvist (Mentor), Genetics

Proteins of the Receptor-Like Kinase (RLK) Gene Family are crucial in plant growth and development, disease resistance, and hormonal signaling in plants. Therefore, characterizing the RLK family may provide insight to how cells perceived outside stimuli. T-DNA insertion mutagenesis Arabidopsis lines are used to isolate plants with defects in RLK genes. Polymerase Chain Reaction (PCR) helps isolate T-DNA-specific and none gene-specific products. By producing, growing, and analyzing multiple homozygous crosses, multiple gene knockouts are made. Analyzing and comparing the mutants with wildtype arabidopsis helps to determine the functions of the RLKs. Currently, one developmental phenotype has been observed in a homozygous mutant for a T-DNA insertion in a single gene, furthering the characterization of this RLK subfamily. By continuing to isolate homozygous mutants and making crosses among mutant plants, we hope to identify the functions of all 600 RLK genes.

EMOTIONAL CONTAGION AND TRAINING OUTCOMES

Darin Chokdee and Stefanie Halverson (Mentor), Communication Arts

The understanding and importance of social involvement in our community originates from our interactions with other people through our emotions. The goal of this research is to examine the effects of trainer emotions on trainee outcomes. This experiment was conducted using an actor displaying positive and negative emotions on video-tape. The training video was shown to a group of students informing them about conflict management. After viewing the tape, the students completed questionnaires and a learning test. It was hypothesized that students would catch their trainer's emotions through emotional contagion, such that trainees in the positive affect condition would experience positive affect and trainees in the negative affect condition would experience negative affect. Trainees in the positive affect condition were also expected to rate their trainer higher, report greater levels of motivation and self-efficacy, and perform better than trainees in the negative affect condition.

ENCOURAGING SCIENTIFIC LEARNING WITHIN DISADVANTAGED NEIGHBORHOOD COMMUNITIES

Rachel Schiesher and Janet Batzli (Mentor), Biology Core Curriculum

I volunteer with 6th grade girls in Girl Neighborhood Power through an after school program called Science Club. This poster highlights my service-learning project through the Community Scholars program to promote interest in the field of science among young girls. My goal is to engage these girls in the process of science by giving them an opportunity to explore their own questions as they monitor a miniature ecosystem of their own design. I describe my experience with the struggles involved in teaching and motivating, as well as ways to connect with girls of a different age, socioeconomic, and academic level than myself. By asking their own questions and having ownership in their experiments, I expect the girls to attain a positive attitude toward science.

ENDOREPLICATION IN SOMATIC CELLS OF AGING C. ELEGANS

Jennifer Marvitz and Craig Atwood (Mentor),
Geriatrics and Adult Development

We propose that the dysregulation of the hypothalamic-pituitary-gonadal axis with reproductive decline leads to altered serum concentrations of reproductive hormones which promotes dyotic signaling to cells and leads to senescence. This signaling induces cells to aberrantly re-enter cell cycle, where cells are prone to becoming cancerous or dysfunctional. To test this hypothesis, we will use the short-lived nematode *Caenorhabditis elegans* and examine whether the post-mitotic somatic cells can re-enter the cell cycle after the reproductive period by measuring 5-bromodeoxyuridine (BrdU) incorporation into cellular DNA. Post-reproductive nematodes will be treated with BrdU (which substitutes for thymidine) and stained immunocytochemically using a BrdU specific antibody coupled with a fluorescent secondary antibody. Staining would indicate that nematode senescence is driven by aberrant re-entry of cells into cell cycle.

ENGAGING UW STUDENTS IN BIOSCIENCE SERVICE LEARNING AND OUTREACH

Joelle Lomax and Jane Harris Cramer (Mentor),
Center for Biology Education

The goal of my project is to assist the Center for Biology Education (CBE) in facilitating undergraduate awareness of, and participation in, biology based service learning and volunteerism, both on campus and in the greater Madison community. I will forge campus and community contacts and collect pertinent resources and opportunities for undergraduates to easily utilize. I will converse with faculty, students and community leaders to assess the needs of various individuals and organizations. I will organize, advertise and implement student information sessions, and gather data and student feedback to assist in the recruiting process. I will use my collected data and resources to ultimately assist CBE in creating an interactive website containing the necessary information for undergraduates to successfully and actively engage in service learning.

ENGINEERING MALTOSE BINDING PROTEIN TO EMPLOY A 6-ARGININE TAG AND IMPROVE PROTEIN PURIFICATION

Abby Wochinski and Brian Fox (Mentor), Biochemistry

Maltose binding protein (MBP), a protein expression vector, will be engineered by inserting an arginine tag made up of several positively-charged guanidino groups on arginine residues, promoting a cation-exchange protein purification step while maintaining the solubility-enhancing property of the original MBP. This new vector would allow for two-step protein purification, using Immobilized Metal Affinity Chromatography (IMAC) and cation-exchange, in lieu of the current one-step protocol. Earlier this year, I successfully created and expressed a linear mutation of 6-arginine residues. However, this mutation severely decreased the solubility of MBP, and the mutagenesis has been redesigned. If this project is successful, it will improve our ability to purify proteins and provide for a more efficient analysis of their structures.

ENRICHING RURAL COMMUNITIES IN WISCONSIN THROUGH THE ARTS

Bridget Albiero, Gretchen Struve and Elaine Scheer (Mentor), Art

In response to both personal interests and the participation in the Community Scholars Program, we have developed and are currently working on a project that supports and promotes the arts in rural Wisconsin. In order to do this we are working with the Pecatonica Educational Charitable Foundation based in Hollandale, WI. Our work with the foundation will be contributing to the organization and completion of the 5th annual summer art workshops at Grandview, a historical art museum sponsored by the PECF. Our work will include contacting potential visiting artists, organizing registration, and assisting with the workshops. The goal of our involvement is to highlight the significance of community through the visual arts.

ENVIRONMENTAL PROFILING OF POLYKETIDE BIOSYNTHETIC GENES WITHIN DIFFERENT SOIL MICROBIAL COMMUNITIES

Kristen Becklund and Robert Goodman (Mentor), Plant Pathology

Soil bacterial communities remain largely unexplored due to the culture-dependent nature of most studies. Culture-independent methods allow for a comprehensive assessment of microbial diversity as well as an alternate approach to natural products discovery. Polyketides are biologically active molecules produced by bacteria, fungi, and plants. They exhibit tremendous structural diversity, and many have medical significance. This study will generate a large collection of polyketide synthase gene sequences in order to assess their diversity and relatedness to known genes. Terminal-restriction fragment length polymorphism will be applied to evaluate polyketide diversity in different soils. In collaboration with eMetagen, LLC, novel sequences will aid in developing probes to identify bacterial artificial chromosome clones containing entire polyketide biosynthetic pathways in order to manipulate their gene products for pharmaceutical discovery.

EPITHELIAL-TO-MESENCHYMAL TRANSITION AND KIDNEY DISEASE

Kevin Martinez and Aji Djamali (Mentor), Nephrology

Kidney Failure is a problem that plagues many people each year. Kidney fibrosis results in kidney failure and may lead to a person's death if left untreated. Emerging evidence suggests that epithelial to mesenchymal transition (EMT) is an important event in kidney fibrosis. During EMT, kidney epithelial cells change their phenotype, lose their primary function and produce molecules leading to tissue fibrosis. Understanding the mechanisms involved in EMT may help us to find treatment strategies that delay or stop kidney fibrosis. Our laboratory is studying the role of oxidative stress in EMT. My project will focus on determining whether the antioxidant molecule Manganese superoxide dismutase (MnSOD) is involved in EMT.

EVALUATION OF A MENTORING PROGRAM FOR CHILDREN OF INCARCERATED PARENTS

Natalie Lang, Andrea Williams and Julie Poehlmann (Mentor),
Human Development and Family Studies

The current project is an evaluation of Mentoring Connections, a first-year program of Madison-area Urban Ministry and Big Brothers Big Sisters of Dane County, whose aim is to help serve local children between the ages of 4 and 16 with an incarcerated parent. This project will assess three primary relationships: the mentor-child, the caregiver-child, and the parent-child relationship. Changes in children's school performance and behavior problems will also be assessed. Children's relationships and behavioral changes will be assessed using quantitative and qualitative measures from multiple sources, including mentors, children, caregivers, and teachers. We believe that the evaluation of this program will help determine the effectiveness of mentoring programs for this particularly high-risk population and facilitate the growth of similar programs nationwide.

EVALUATION OF BIOCIDES-TO-FOOD RATIO IN CHLORAMINATED DISTRIBUTION SYSTEM

Sophia Chen and Soumya Srinivasan (Mentor),
Civil and Environmental Engineering

Drinking water undergoes several treatment steps before human consumption, namely coagulation, flocculation, sedimentation, filtration, and finally disinfection. The distribution system conveys this treated water to the consumers. This project focuses on evaluating water quality in the distribution system. The pilot plant located next to Lake Mendota has a treatment plant and a distribution system for conducting experiments. At this preliminary stage, the distribution system is prepared for running experiments by passing highly chlorinated water of concentration 50mg/L through it. The goal is to run chlorinated water until all the bacteria are killed in the distribution system. This is achieved by performing Baclight analysis on the water samples collected from the distribution system to examine the distribution of live and dead cells under the microscope.

EVOLUTION AND THE MISSIONARIES: AN EXAMINATION OF J.D. DANA AND L.E. THRELKELD

Rebecca Drews and Adam Nelson (Mentor), Educational Policy Studies

In 1859 Charles Darwin released his *Origin of Species*. Most people claim a close acquaintance with Darwin's theory of evolution as well as the conflict it created. Less known and understood are the ideas that circulated in the decades directly before Darwin's *Origin of Species* was published. In the 1830s and 1840s, missionaries played an active role in the advancement of both the natural sciences and the "humanistic" sciences such as philology, the study of language. Both roles proved instrumental in the development and acceptance of evolutionary theory and Darwinism. By studying the published letters and articles of James Dwight Dana and Lancelot Edward Threlkeld, I examined how the missionaries aided naturalists of the time as well as evolutionary theory development.

EVOLUTION OF PERIODICITY IN PERIODICAL CICADAS

Paul Heideman, Nicolas Lehmann-Ziebarth, Rebecca Shapiro,
Gordy Stephenson, Sonia Stoddart and Anthony Ives (Mentor), Zoology

Periodical cicadas present numerous puzzles for biologists. First, their period is fixed, with individuals emerging as adults precisely after either 13 or 17 years (depending on species). Second, even when there are multiple species of either 13- or 17-year cicadas at the same location, only one or rarely two broods (cohorts) co-occur, so that periodical cicada adults appear episodically. Third, the 13- or 17-year periods of cicadas suggests there is something important about prime numbers. Finally, single broods can dominate large areas, with geographical boundaries of broods remaining generally stable through time. Theoretical arguments favor a combination of predator satiation and nymph competition as being key to the evolution of strictly fixed periods and occurrence of only one brood at most geographical locations.

EVOLVING A TWO-TIERED ECOLOGY OF ORGANIZATIONS

Travis Kriplean and Robert Meyer (Mentor), Computer Science

A distributed system of cooperating agents can often solve problems better than a centralized authority. Moreover, in uncertain environments, definitions of optimal behavior are rarely robust and it is advantageous to open the agents to evolution. Operators like crossover and mutation allow a population of agents to traverse the landscape of possible solutions under the selective pressures of a learning regime. While most team-based evolutionary systems have a static learning regime, I present a two-tiered model that opens the learning regime to evolutionary processes. I use a planning tier that defines the learning process of its agents. A population of such organizational planners co-evolves, while a population of agents evolves within each organization. I demonstrate the advantages of this two-tiered system in a predator/prey environment.

F4/80-POSITIVE AND CD68-POSITIVE MACROPHAGES IN INJURED MURINE SKELETAL MUSCLE

Lydia Leung and Barbara Schneider (Mentor), Nursing

Eccentric contractions commonly cause an acute muscle injury during high-intensity sports activities. The purpose of this research is to describe the presence and distribution of macrophages expressing CD68 or F4/80 antigen in murine skeletal muscle injured by eccentric contractions. Cross-sections will be cut from uninjured and injured lateral gastrocnemius muscles. These cross-sections will be stained by antibodies that recognize F4/80 or CD68 antigens expressed by macrophages. The concentration and distribution of these macrophages will be determined in the stained uninjured cross-sections. Then the staining in the injured cross-sections will be compared with the uninjured cross-sections. The results may increase our understanding of the macrophage response to an exercise-related muscle injury.

FACTORS ASSOCIATED WITH BONE MINERAL DENSITY (BMD) IN PREMENOPAUSAL WOMEN WITH TYPE 1 DIABETES

Angie Danielski and Mari Palta (Mentor), Population Health Science

Women with type 1 diabetes have a higher prevalence of decreased bone mineral density (BMD), an important predictor of future fracture risk. However, it is unclear which factors affect BMD in these women. We measured BMD in premenopausal women with type 1 diabetes and investigated associations with diabetes care, anthropomorphic and demographic measures, health behaviors, family history, and reproductive/hormonal factors. Data were collected in a pilot study of 20 women with type 1 diabetes recruited from three Madison-area diabetes clinics. During the visit, each woman had a BMD scan of her ankles, a blood sample drawn and brief physical. Two health questionnaires were administered. This research and future studies could help prevent and treat decreased BMD in premenopausal women with type 1 diabetes.

FAST BLOOD FLOW MEASUREMENTS IN MAGNETIC RESONANCE IMAGING: IN VITRO AND IN VIVO VALIDATION

Andrew Wentland and Thomas Grist (Mentor), Radiology

Magnetic resonance imaging can be used to measure blood flow. In scanning those regions of the body that move during respiration, scans must be performed within the time of a patient's breath hold. However, traditional scanning methods have been unable to generate images with accurate flow measurements within this time. Using a new scanning method, accurate flow measurements can be obtained within the time of a patient's breath hold. The first phase of this study validated the method in vitro using a flow pump, showing a high correlation, $R^2 = 0.998$. The second phase of this study has begun to demonstrate accurate flow rates in human volunteers at an accuracy greater than 95%. This method may have a significant impact on evaluating renovascular hypertension.

FAST DYNAMIC FRACTURE OF BRITTLE OBJECTS SUITABLE FOR COMPUTER GAMES

Ohan Oda and Stephen Chenney (Mentor), Computer Science

Fracture is an important feature for computer games to enhance interactivity and realism. Due to the time-consuming nature of fracture modeling, most computer games do not provide accurate fracturing features. Existing computer games that provide some fracturing pre-calculate cracks ahead of time in order to process the break instantaneously, but always exhibit the same breaking behavior no matter which part of the object is hit. The ideal fracture model for computer games should be fast and respond to user actions somewhat realistically. Most existing fracture modeling techniques were designed for non-real-time computer animations, and are too expensive but also more realistic than necessary for computer games. Our fracturing model uses a novel multi-stage dynamic refinement scheme to increase the realism of fracture while keeping the computational cost down.

FDA: FOOD & DRUG ADMINISTRATION OR “FAST DRUG APPROVAL”

Katherine Gsell and Victor Hilts (Mentor), History of Science

This research looks at the potential side effects of pharmaceutical drugs, including those that have recently brought the FDA into the news. It examines the history of the FDA, how the FDA has changed over time, and how this change affects pharmaceutical drugs on the market today. It looks closely at how the FDA balances risks and benefits, the role of the FDA drug advisory committees and inspectors, and the FDA's responsibilities following drug approval. I will also examine how the rapid introduction of drugs into the market has weakened approval standards. This research draws upon a combination of primary and secondary sources, as well as case studies of the controversial drugs Celebrex and Vioxx.

FIGHTING CHILDHOOD CANCER: TUMOR IMMUNOTHERAPY OF MURINE NEUROBLASTOMA

Brian Schmidt and Paul Sondel (Mentor), Human Oncology

Neuroblastoma is a malignant tumor that affects children. Immunotherapy, to activate and target immune cells to destroy tumor, is a promising approach in treating this deadly disease. The cytokines interleukin-2 (IL-2) and interleukin-12 (IL-12) can stimulate a potent immune response that may be increased with targeting to the tumor. One antigen found on neuroblastoma is disialoganglioside (GD2)—this antigen was targeted in the treatment of murine NXS2 neuroblastoma. Specifically, NXS2 tumor size was reduced after administration of a fusion protein (FP) that consists of IL-2 and an anti-GD2 monoclonal antibody. Additional experiments indicated that IL-12 decreased tumor size. A combined therapy of IL-12 with the FP will be tested, in an attempt to obtain synergistic effects.

FINDING GENES SUPPRESSING K⁺ SENSITIVITY BY OVER-EXPRESSING A MUTANT K⁺ CHANNEL IN ESCHERICHIA COLI

Elias Wan and W. John Haynes (Mentor), Laboratory of Molecular Biology

Most cellular organism maintains high levels of internal potassium (K⁺) ions. The resulting gradient across the membrane is used for many cellular functions (like electrical signaling in neurons). Often cells regulate voltage-sensitive activities with proteins that open and close physical “channels” allowing K⁺ ions to selectively flow through the membrane. Deletion or over-expression of the K⁺ channel found in Escherichia coli, a bacterium found in the intestinal tracts of humans and animals, shows no apparent phenotype. However over-expression of channels with mutations, most often in the regulatory domain, result in K⁺ sensitive growth phenotypes. In an effort to identify additional genes involved, transposon mutagenesis was used to look for disrupted genes that suppress the K⁺ sensitivity.

FORMATION OF STARS

Mai Chang and Ed Churchwell (Mentor), Astronomy

The Galactic Legacy Infrared Mid-Plane Survey Extraordinaire (GLIMPSE) survey of the inner galactic plane seeks to understand the physics of star formation. Now, we know that ambient matter collects in an accretion disk in the equatorial plane of a forming star (protostar). At the same time, a bipolar jet ejects matter along the spin axis of the system. It is not understood how matter from the accretion disk migrates onto the central star and how the bipolar jet is driven. GLIMPSE will reveal thousands of protostars in four wavelength bands which the orientation and size of the accretion disk and luminosity of the central protostar can be inferred. We can also determine the relative number of stars in each stage of evolution, thus telling us how rapidly stars move through their various early stages. We must first understand our galaxy, the Milky Way, in order to understand other galaxies.

FUNCTION OF MAP KINASE KINASE KINASE GENES IN ARABIDOPSIS STRESS RESPONSE

Kristie Lukas and Patrick Krysan (Mentor), Horticulture

The Arabidopsis MAP Kinases Kinase Kinases proteins encoded by the genes ANP1, ANP2, and ANP3 play unknown roles in Arabidopsis signal transduction (the process by which information flows through a living organism). Current experiments aim to determine the function of these ANP genes during Arabidopsis germination. Double-mutant specimens are subjected to environmental stress and allowed to germinate. The number of germinated individuals per assay is counted for each double-mutant and is compared to the wild-type. Preliminary results indicate that double-mutants of ANP1 and ANP2 are particularly sensitive to salt stress. Future experiments will attempt to confirm the causal role of the anp mutations in the observed salt sensitivity. Knowledge of the intricacies of signal transduction in Arabidopsis holds promise for creating weather tolerant agricultural products.

FUNCTIONAL ANALYSIS OF RNAI CONSTRUCTS

Edward Kabara and Alan Attie (Mentor), Biochemistry

RNAi is emerging as a powerful tool for silencing gene expression. The Attie lab created several RNAi constructs to study SorCS1, a gene involved in diabetes susceptibility. I have begun to evaluate these constructs for their efficacy in reducing the expression of SorCS1. I transfected cells with a construct driving overexpression of a SorCS1 construct consisting of the DNA for the SorCS1 gene and a sequence recognized by a commercially available antibody and the various RNAi constructs. As a control, I also transfected the cells with a construct containing a visibly fluorescent protein. From these cells, protein was extracted and then analyzed by Western blot. Two of the three constructs look quite promising for future study and use.

FUNNY LOOKING:

A STUDY OF ASYMMETRIC GALAXY PHENOMENA

Alex Viana and Eric Wilcots (Mentor), Astronomy

Our universe is full of symmetry. This symmetry is evident in the essentially spherical shapes of planets and stars as well as the ellipsoidal shape of the orbits of planets and comets. On a larger scale our galaxy itself like the majority of the galaxies in the universe exhibit a high degree of symmetry. This natural and pervasive symmetry is one of the more remarkable and beautiful aspects of nature. However, there is significant population of the galaxies that are clearly asymmetric. The cause of this asymmetry, and principally if it is an intrinsic characteristic of galaxies or the result of interactions, is a poorly understood topic. This presentation will focus on exploring the mystery of galactic asymmetry and the current theories and research aimed at understanding this phenomena.

GENDER, MIGRATION, POLICY: IMMIGRANT WOMEN AND THE ITALIAN LABOR MARKET DURING THE 1990s

Ingrid Stokstad and Orfeo Fioretos (Mentor), Political Science

The presence of female migrant workers in the Italian labor market is not a new phenomenon. However, scholarship has had little to say about immigrant women in the national economy, especially regarding policy implications. Indeed, historically women's role in immigration has been considered solely in the context of family reunification. By researching the influence of 1990s Italian immigration policy on migrant women in the labor market, this thesis analyzes the role of the state in shaping female migrants experience with the Italian national economy. Determining that restrictive policy measures forced migrant women into the underground economy, the study illustrates the often detrimental effects of restrictive legislation. Furthermore, the research demonstrates the need for alternative policy considerations, particularly in the broader context of the European Union.

GENE EXPRESSION RELATED TO CHRONIC PAIN FOLLOWING SPINAL CORD INJURY

Tiffany Gerovac, Nicholas Turner and Daniel Resnick (Mentor), Neurological Surgery

Up to 75% of spinal cord injury (SCI) patients experience chronic neuropathic pain. In order to test whether or not a specific pattern of gene expres-

sion is associated with chronic neuropathic pain following SCI, our research employs rat and mouse models. A reproducible spinal cord injury is administered to all experimental animals while control animals undergo only a laminectomy (exposure of the cord preliminary to injury). Weekly exams test for functional recovery and the presence of pain. Spinal cord tissues from all subjects are then evaluated using immunochemistry staining and Real-time Polymerase Chain Reactions (RT-PCR) to reveal and localize any differential changes in gene expression. Recognition of specific gene expression changes offers a potential target for the treatment of chronic neuropathic pain.

GENETIC DETERMINANTS OF BONE STRENGTH

Adienamikiphe Igoni and Robert Blank (Mentor), Endocrinology

More than half of bone strength differences among individuals are genetically mediated. Dr. Blank's lab studies this in mouse F2 intercrosses between parental strains with divergent bone properties. Following sacrifice at 17 weeks of age and retrieval of bones and organs, the lab performs 3-point bend tests of the femora and humeri. The test allows us to determine the stiffness, yield point, maximum load, post-yield deflection, and energy to failure for each bone tested. The mechanical data obtained from these tests and the animals' genotypes are used to map the responsible genes to specific locations in the genome.

HEALTH IN UGANDA

Stephen Hunt, Kim Isely, Jenna Klink, Alex Means and John Ferrick (Mentor), International Agriculture Programs

A group of CALS students studied health and nutrition in Uganda over winter break. Each student had an individual research project in addition to learning about health and nutrition in general. Students will each give a short presentation on their projects, including: The controversy over using DDT to prevent malaria, The use of insecticide treated nets to prevent malaria, Malaria treatment and policy, Access to family planning services and the problem of unsafe abortion, Access to anti-retroviral drugs to treat HIV/AIDS, How society deals with orphans. The group is currently developing Project Healthy Village, a collaboration between UW and the Ugandan Institute of Public Health that will work towards providing a clean, safe water supply for villages in Uganda.

HEALTHY BODIES: EDUCATIONAL EMPOWERMENT FOR ADOLESCENT GIRLS

Sofia Gaudioso and Shelly Grabe (Mentor), Psychology

Adolescent females of every race, class, and ethnicity struggle with issues of body satisfaction and self-esteem. This service project addresses the formation of negative body image and self concept in adolescent females of lower socioeconomic status and diverse background at the Kennedy Heights Community Center. The premise of the program is to create a positive group environment which fosters discussion, activity, and education in the areas of body image dissatisfaction, self esteem, and self efficacy. Participants meet with group leaders once weekly to engage in group discussion, activities, and occasional field trips surrounding these issues. This is an ongoing project which continues to be a learning experience for everyone involved. Our progress thus far has revealed increased awareness and empowerment of targeted issues.

HERITABILITY OF CONDENSED TANNINS AND PHENOLIC GLYCOSIDES IN TWO DAMAGE ENVIRONMENTS

Eder Valle and Michael Stevens (Mentor), Botany

Aspen (*Populus tremuloides*) shows large amounts of genetic variation in levels of defense against herbivores. Genetic variation is required for evolution of defense, but evolution can only occur if such variation is heritable. We are interested in determining if levels of defense chemicals (condensed tannins and phenolic glycosides) are heritable in aspen, in both undamaged and herbivore-damaged environments. Levels of heritability were assessed using seedlings from 15 families produced in controlled crosses. Half of the seedlings were undamaged and half were damaged (exposed to gypsy moths and artificial defoliation). Our study will help show how environmental conditions affect the expression of genetic traits.

HIGH-SPEED IMAGING OF VOCAL CORD SCARS

Byron Edgar and Douglas Montequin (Mentor), Surgery

The purpose of this project is to determine under what circumstances augmentation of stroboscopy with high-speed imaging or digital kymography is useful and practical from a clinical perspective. A large portion of our time

is spent viewing both normal and damaged or diseased vocal chords in order to qualitatively and, with the use of Matlab, quantitatively determine the place for each technique. As we hypothesized, stroboscopy yields excellent data for periodic vocal cord vibration but gives poor results for a periodic and highly a periodic vibration; high-speed imaging is excellent for a periodic and highly a periodic but not worth the cost for periodic vibration of the vocal cords; and kymography deals excellently with assessing the symmetry of vocal cord vibration.

HMONG LANGUAGE AND MUSIC

Pui Li and Marlys Macken (Mentor), Linguistics

This project studies the way in which music of the Hmong qeej, expresses words. Qeej is a pipe musical instrument made of bamboos. It is played in different occasions such as New Years, wedding ceremonies and funerals. Specifically, qeej plays a unique and important role in funeral ceremonies, because the qeej music is transformed to words to communicate with the spirit of the dead person. By working with a native Hmong speaker and the Hmong-English dictionary, I translate a document on songs played by qeej from Hmong to English. The goal is to provide an English transcription of the qeej songs played in funeral ceremonies, so that the structure of the Hmong language used in the songs can be studied.

HMONG WOMEN: CHANGING ROLES IN THE COMMUNITY FROM LAOS TO AMERICA

Kajua Lor and Marlys Macken (Mentor), Linguistics

The main goal of this project is to investigate how the role of women in the community has changed from the villages of Laos to the bustling cities of America. By researching the history of Hmong women and interviewing UW–Madison students, the struggles and narratives of Hmong women from childhood to womanhood will be documented. Our findings will be analyzed to explore the manner in which the roles of Hmong women have transformed across generations. We hope to gain a further understanding of women's roles in the Hmong community.

HOW A STAR IS BORN

Kelly Leaver and Ed Churchwell (Mentor), Astronomy

Much about star formation is still a mystery. The GLIMPSE (Galactic Legacy Infrared Mid-Plane Survey Extraordinaire) team uses data received from the Spitzer Space Telescope to locate new regions of star formation and to better understand the process of star birth. We apply the data in many forms, including creating tricolor computer images of small regions of the galaxy to locate new stars. After loading the wavelength channels and adjusting the contrast, I searched the pictures for a new star indicator identified by the way it interacts with its surroundings. Forming, stars spin, gather matter, and create bipolar outflows along their spin axes, which slow the rotation of the accretion disk, allowing matter to gravitate to the center. Our goal is to learn more about star creation by pinpointing where bipolar outflows, ultra compact H II regions, and other areas of massive star formation are and studying them more closely.

IDENTIFICATION OF GENES CONTROLLING ECONOMICALLY IMPORTANT TRAITS IN DAIRY CATTLE

Colin Harrison and Hasan Khatib (Mentor), Dairy Science

The primary objective of genomic research in livestock species is to identify and map individual quantitative trait loci (QTL) that control economically important traits. Through use of linked marker loci, QTL can be utilized in genetic improvement programs by procedures, termed “marker assisted selection” (MAS) for genetic improvement within a breeding nucleus and “marker assisted introgression”, for transferring useful alleles from a resource population to a breeding nucleus. MAS could greatly enhance the reliability of genetic information of young animals. The specific objective of this proposal is to confirm the association of the specific genes with milk production and health traits found in the Holstein population in an independent population composed of 400 cows.

IDIOSYNCRATIC TOXICITY ASSOCIATED WITH POTENTIATED SULFONAMIDES IN THE DOG

Lydia Grundahl and Lauren Trepanier (Mentor), Medical Sciences

Potentiated sulfonamide antimicrobials are commonly used to prevent and treat opportunistic infections in both dogs and humans. However, sulfamethoxazole (SMX), sulfadiazine (SDZ), and sulfadimethoxine (SDO) can lead to the development of an adverse reaction, referred to as sulfonamide hypersensitivity, in both species. These reactions are seen at an especially high incidence in HIV positive humans, for which potentiated sulfonamides are otherwise the single most effective treatment. The purpose of this research is to study the detoxification pathways for metabolites of SMX, SDZ, and SDO in both dogs and humans with sulfonamide hypersensitivity. These studies will determine whether defects in sulfonamide detoxification are a risk factor for the development of drug-specific T-cells and hypersensitivity following administration of potentiated sulfonamides. They will also help us understand, predict, and identify genetic predispositions to the development of idiosyncratic hypersensitivity.

IMMUNOHISTOCHEMICAL LOCALIZATION OF ALG-2 IN UVEAL MELANOMA CELLS

Indrani Banerjee and Arthur Polans (Mentor),
Ophthalmology and Visual Sciences

The objective of this project is to determine the cellular localization of the calcium binding protein ALG-2 in uveal melanoma. ALG-2 serves as an intracellular calcium monitor. In response to aberrant levels of calcium, ALG-2 induces a form of cell death called apoptosis. It is hypothesized that ALG-2 forms part of a complex with endoplasmic reticulum (ER) and once activated induces degradative enzymes leading to cell death. However, in uveal melanoma, primary cancer originating in the eye, ALG-2 is down-regulated, thus protecting tumor cells from apoptosis. Prior localization studies reported conflicts regarding association of ALG-2 with ER. In order to determine its localization, double-label fluorescence microscopy was performed using primary antibodies specific for ALG-2 and calnexin-ER protein markers. Initial experiments demonstrated co-localization between ALG-2 and calnexin, indicating that ALG-2 likely is associated with the ER.

IMPACT OF LOW LEVEL CONCENTRATIONS OF A COMMON LAWN HERBICIDE ON LEARNING ABILITIES IN MICE

Brianne Zechlinski and Warren Porter (Mentor), Zoology

This research project investigates the effects of herbicides on the fetus. The fetus is exposed to herbicides when the pregnant mother consumes contaminated food or water. Pregnant mice are dosed through their drinking water with low level concentrations of Trimec, a commonly used broad leaf killing herbicide. The young are raised and run for four weeks through a maze designed to measure learning in food recognition, food existence, positional learning, and locational learning. The maze consists of several radiating arms. Some arms have accessible food with pegs as markers, and some have inaccessible food. The highest level of learning is locational, where the mouse associates marked arms with food. It is anticipated that mice exposed to Trimec will display lower learning abilities.

IMPACT OF NEWBORN SCREENING ON PARENT-INFANT RELATIONSHIP

Jade Rosario and Audrey Tluczek (Mentor), Psychiatry

The Parent-Infant Study will determine how the results of newborn screening affect the relationship between parents and their infants. Another goal of the study is to assess the parents' emotional distress due to the screening results. The 4 groups of families we study are families with infants who have cystic fibrosis (CF), hypothyroidism, are CF carriers, and a healthy control group. We collect information about the families using videotaped observations, parent interviews, developmental assessments, and questionnaires when infants are six weeks, six months, and twelve months old. The main hypothesis is that parents of children with CF will show more disturbances in their attachment with their infants than the other groups. This project is still in the data collection stage and the main hypothesis remains untested.

INDIVIDUAL DIFFERENCES IN THE PERCEPTION OF AFFECTIVE AUDIO STIMULI

Victoria Vinarsky and Diane Gooding (Mentor), Psychology

The focus of my research is to examine the effects of personality factors, such as anhedonia on the experience of affective stimuli. In this project the affective stimuli are in the form of auditory stimuli which have been experimentally designed to elicit positive, negative, or neutral reactions. Personality factors are measured through a series of personality questionnaires. The affective stimuli used are a subset of the International Affective Digitized Sounds (IADS). The participants rate their emotions toward the sounds on a scale rating valence (from pleasant to unpleasant) and a scale rating arousal (from calm to excited). This study will provide greater insight into how social anhedonia, defined as a pleasure deficit, may affect the experience of typically pleasant stimuli.

INDUCTION OF APOPTOSIS IN TRAMP PROSTATE CANCER CELLS BY BLACK AND GREEN TEA POLYPHENOLS

Najia Zaman and Mukhtar Hasan (Mentor), Dermatology

(-)-Epigallocatechin-3-gallate (EGCG) and theaflavins are polyphenols found in green tea and black tea respectively. Recently our lab showed that the oral infusion of green tea polyphenols in transgenic adenocarcinoma of the mouse prostate (TRAMP) model showed a significant inhibition of prostate cancer development. Extending this study, we studied the molecular basis by which EGCG and theaflavin may exert its chemopreventive effects on the TRAMP cells line C2. EGCG and theaflavin treatments to C2 cells resulted in a dose-dependent inhibition of cell proliferation. Our data demonstrated that EGCG and theaflavin treatments of C2 cells resulted in a dose-dependent decrease in Bcl-2 protein levels, induction of cytochrome c and activity and protein expression of caspases-3 and -9. Further study is required to confirm these observations by other experimental procedures.

INFLUENCES ON YOUTH SMOKING

Hannah Anderson and Ellen Thompson (Mentor),
Life Sciences Communication

The Youth Tobacco Survey is aimed at understanding how the media, peers, and family influence adolescents' smoking decisions. Past research has shown that adolescents are highly influenced by their peers when deciding to smoke. We hypothesize that the media may indirectly influence adolescent smoking by affecting peer norms. Therefore, we expect that exposure to smoking in the media will be linked to higher adolescent smoking rates. We have completed three waves of surveys in four middle schools in South and Central Wisconsin. Using correlational analysis, we found a link between adolescents frequently allowed to watch R-rated movies and high smoking rates. We plan to explore if this is due to frequent images of smoking in R-rated movies or other factors.

INHIBITION OF ENDOGENOUS TGF-B RESPONSIVE GENES USING NOVEL SMALL MOLECULE INHIBITORS

Adam Schiro and F. Michael Hoffmann (Mentor), Oncology

TGF-b is involved in several cell processes such as growth, differentiation, and apoptosis. This pathway is unique because of its role as both a tumor promoter and tumor inhibitor. Signalling involves the binding to surface type I receptors and the subsequent phosphorylation of cascading Smad complexes into the nucleus where it plays a role in gene expression. Selective inhibition of this pathway at the transcriptional level is anticipated through the use of select small molecule treatments to HepG2 cells with TGF-b. Investigation of endogenous TGF-b regulated genes using quantitative RT-PCR will determine if these select small molecules are successful at disrupting expression of these genes.

INITIATIVE TO IMPROVE THE STATUS OF WOMEN: WISCONSIN WOMEN = PROSPERITY (WW=P)

Jason Gonzalez and Dennis Dresang (Mentor), Political Science

The University of Wisconsin–Madison has developed a partnership to apply the academic talent and energy of faculty and students to public policy issues that relate to the status of women. Collaborating to conduct research, develop policy options and recommendations, stimulate public discussion and debate, and disseminate the findings of studies. Specifically taking an in depth study of what the education system in the state ranging from kindergarten through

undergraduate college is doing to encourage women to be politically involved in their communities and state. Wisconsin Women Equals Prosperity is a non-partisan, initiative directed by Lieutenant Governor Barbara Lawton, with the support of Governor James Doyle, to improve the status of women and to drive economic growth for Wisconsin by increasing the success of women.

INTERNATIONAL REGULATION OF PHARMACEUTICALS

Amina Nur and Heinz Klug (Mentor), Law School

This research project examines the role and efficiency of International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) on the regulation of medicine production and global pharmaceutical R&D. ICH seeks to synchronize the application of their strict product registration requirements to reduce unnecessary or repetitive testing, increasing the availability of medicines. It is hypothesized that the ICH allows regulatory regimes in the United States, European Commission, and Japan to monopolize the world's production of medicine and global pharmaceutical R&D with the ICH's strict guidelines. To further analyze the hypothesis, library research would clarify the complexity and effectiveness of pharmaceutical industry and its regulatory regime: ICH. Furthermore, research on non-ICH parties and critics would provide a neutral and different viewpoint.

INTRA-ORGANIZATIONAL COMMUNICATION AND COORDINATION IN A SOFTWARE COMPANY

Travis Kriplean and Daniel Kleinman (Mentor), Rural Sociology

The past several decades have seen the emergence of “knowledge industries” like biotechnology and software. Existing research suggests that firms in these industries do not operate according to traditional hierarchical logics. My study contributes to this developing literature, exploring the substitution of command management in favor of “bottom-up” processes. I address this issue by examining the variation in the communication content of messages within a single software company. After compiling data from weekly meetings and email, I construct a network of communications from the perspective of a single team, overlaying this image onto a representation of the company itself. I then distinguish employees by bureaucratic rank. After coding the messages, I analyze whether the character of the communications are significantly differentiated based on rank.

INVESTIGATION AND SYNTHESIS OF NEW SILOLE DERIVATIVES

Benjamin Dickey and Robert West (Mentor), Chemistry

At the Organosilicon Research Center, we are investigating the behavior and properties of newly synthesized organosilicon compounds. This study seeks to explore previously unknown derivatives of 1,1-dichloro-2,3,4,5-tetraphenylsilole and their properties, in particular for use in organic light-emitting diodes (OLEDs) for display devices, which will be cheaper and more energy efficient than the current plasma and liquid crystal displays (LCD's). Because of a small gap between lowest unoccupied molecular orbital (LUMO) and highest occupied molecular orbital (HOMO) in these ring compounds, siloles have very interesting electronic properties and appeared to be and strongly highly fluorescent and electroactive. Our research also seeks to improve the efficiency of current synthesis methods for existing silole compounds.

ISLAM AND MODERN EGYPT: A VIEW FROM THE STREETS

Ryan Gottula and Jonathan Mark Kenoyer (Mentor), Anthropology

The purpose of this project is to explore how modern Egyptians perceive and rationalize their political system with their many different interpretations of Islam. During the academic year of 2003–04, I traveled extensively throughout Cairo and other parts of Egypt every weekend. With my background in Cultural Anthropology and Political Science I have attempted to survey and analyze the various ways in which some Egyptians discuss and criticize the at times inefficient and polarizing aspects of their government. From the failures of Nasr's socialist measures, Saddat's capitalist agenda, and Mubarak's western designs, some Egyptians have found their answer to their destitute situation in specific fundamental aspects of Islam. This project attempts to explore the trajectories of modern everyday Egyptian society, with a special emphasis on the character of Egyptian civil society and some general attitudes toward political "corruption" and globalization.

LFY AND LCRLFY GENOTYPING IN ARABIDOPSIS

Adam Clements and David Baum (Mentor), Botany

At David Baum's lab I assist in the study of a putative transcription factor LcrLFY. Previous studies have shown that the LFY gene affects the development of the inflorescence. To study LcrLFY we transform Arabidopsis plants to include this transgene. I then screen plants for the informative genotype lfy/lfy LcrLFY/LcrLFY. To do this DNA is purified, amplified with PCR and run in an electrophoresis gel. LcrLFY plants show resistance to an herbicide, therefore when this herbicide is applied only plants with LcrLFY will live. The study of LcrLFY has been going on for approximately 4 years and my portion of the project will end at the end of the semester.

LITHIC ANALYSIS AND THE SEASONAL ROUND AT PINE RIVER SITE, WI

Joseph Lehner and Jonathan Kenoyer (Mentor), Anthropology

The purpose of this research was to identify a range of daily activities at an ancient site along the Pine River based on the function of chipped stone tools, which represent one type of artifact found by archaeologists. The Pine River site is thought to have been seasonally occupied in the fall by Native American communities. Measurements were taken on stone scrapers to identify common characteristics and the debris resulting from resharpening. Two samples of stone debris were then chosen to locate scraper resharpening episodes. Variation in edge-angles of the scrapers suggests differential functions. The combined data from the analyses with ethnographic and experimental data suggest that early people were involved in activities that are related to seasonal occupation, such as hide preparation and wood-working.

LOCAL PARTNERSHIPS FOR COMMUNITY ASSESSMENT AND PLANNING

Jessica Kapelke-Dale and Susan Zahner (Mentor), Nursing

This study examined the prevalence, characteristics, and effectiveness of community assessment partnerships between local health departments and other organizations. Local health departments in Wisconsin completed a 2-stage, cross-sectional survey. A subset analysis of community assessment partnerships was conducted using descriptive, bivariate, and multivariate statistical methods. Ninety percent of local health departments reported a partnership focused on community assessment. Sixty-six percent of community assessment partnerships had existed for three or more years, and all of these had implemented plans. Community assessment partnerships were more likely to have formed due to a mandate, to include many partners, and to receive financial support from the local health department. Local health departments and community partners realize mutual benefits from collaborating on community assessment.

LOCALIZATION OF INWARDLY RECTIFYING POTASSIUM CHANNELS IN RAT OLFACTORY CORTEX

Mark Howe and Lew Haberly (Mentor), Anatomy

Partial epilepsy of temporal lobe origin affects around 1% of the world population, and 30–45% of these cases cannot be controlled with current anti-convulsant drugs. An elevation of the extracellular potassium (K⁺) concentration to an abnormally high level is widely believed to play a central role in the generation and spread of partial temporal lobe seizures. The hypothesis guiding my research is that inwardly rectifying potassium channels (Kirs) in neurons assist in redistributing excess potassium during periods of abnormally strong neuronal excitation. My goal is to test predictions from this hypothesis regarding the spatial distribution of Kirs in neurons using antisera to Kir specific subunits. Preliminary experiments have yielded promising results showing channel distributions consistent with the model. Confirmation of a role of Kir channels in extracellular [K⁺] regulation may lead to a new approach in the treatment of temporal lobe seizures.

LOCATING GENES THAT CODE FOR ALTERNATIVE POTASSIUM ION CHANNELS IN E. COLI.

Kevin Beier and Stephen Loukin (Mentor), Molecular Biology

It is hypothesized that there is at least one alternative ion channel in addition to the main ion channels in E. coli that allow potassium ions to enter and leave the cell, and that without this channel, the E. coli will not be able to survive. In order to test this hypothesis, transposons of known sequences were inserted into E. coli cells and the cells were screened to determine which cells were under selective pressure to retain the plasmid. Since the only gene essential to cellular function located on the plasmid was for the potassium ion channel, the loss of the plasmid resulting in death indicates that the targeted channel gene has been eliminated from the genome.

LT. GOVERNOR'S INITIATIVE TO IMPROVE THE REPRODUCTIVE HEALTH STATUS OF WOMEN IN WISCONSIN

Camellia Mortezaadeh and Dennis Dresang (Mentor), Political Science

This project researches and develops policy recommendations regarding women's reproductive rights for the Lt. Governor of Wisconsin's Wisconsin Women = Prosperity initiative. This project first studies emergency contraception (E.C.) availability to victims of rape and sexual assault. In addition, the costs and benefits of increasing E.C. access in relation to tax payers through the use of state subsidized funding is examined, as is other state's initiatives to increase E.C. access and awareness. The second part of the project researches the reproductive rights aspect of abortion in Wisconsin, specifically, the state's status quo in terms of abortion accessibility and awareness. It also delineates the emotional, physical, and societal costs of unplanned pregnancies. Hopefully, our endeavors will make the issues and impediments of accessing reproductive health services more widely known, and enable something to be done on a higher legislative level.

MADISON CITY WALKERS: FEELING FIT AND FABULOUS

Jessica Kream and Joe Elder (Mentor), Sociology

Many Americans do not exercise for the federally recommended daily amount of 30 minutes. Our project consists of forming a coalition of dedicated citizens that are passionate about implementing a healthy and active lifestyle. Our primary goal for Madison City Walkers is to encourage people to meet at the Capitol during their lunch hour and walk. We constructed a formal proposal for Mayor Dave Cieslewicz who supported our idea along with several businesses. We designed an informative website and club logo that will adorn t-shirts and water bottles distributed on our club kick-off day scheduled for April 1, 2005, at the Capitol Square. We hope that this club can establish itself as a healthy outlet for Madison-area residents on a weekly basis.

MALE LEADERS VS. FEMALE LEADERS: CHARACTERISTICS ASSOCIATED WITH EACH

Selamawit Zewdie and Stefanie Halverson (Mentor), Communication Arts

This project seeks to understand the different types of traits and characteristics that are associated with male leaders vs. female leaders. The broader goal of this project is to find out what types of perceptions are associated with female leaders that are in the same position as male leaders, and to what extent these perceptions vary from one another. From the first round of surveys that we conducted, it was clear to see that there is a significant difference in the way female leaders are perceived as opposed to their male counterparts. Currently we are in the process of modifying and putting all the different traits we collected from the first survey into different categories for further investigation. We hope to discover what prototypes are generally associated with female leaders vs. male leaders.

MALE MENTORING WITH “LIFE AS A BOY”

Michael Minkoff and Harry Brighthouse (Mentor), Philosophy

I have spent time volunteering as a male mentor with the program Life as A Boy, run by the Vera Court Neighborhood Center. There group meets twice a week: during the Thursday meeting, the children each say their name and age, and talk about their weeks. After this meeting, which usually lasts about a half hour, the children have recreation time. On Saturdays, the group generally does a recreational activity together, with past events including going to a Milwaukee Bucks game and going to the circus. In addition to the vol-

unteering, I am reading literature around the injustices underprivileged children, such as those in the group, face growing up and how these unfair upbringings affect their future prospects. This reading provides me with a much richer learning experience, as it provides insight into the children's struggles of which I might otherwise not be made aware.

MEASURES OF ENACTED CURRICULUM: ACCURATELY PRODUCING COMPARABLE DATA ON TEACHING PRACTICES

Jason Rea and Alissa Minor (Mentor),
Wisconsin Center for Education Research

With the Wisconsin Center for Education Research, Measures of Enacted Curriculum attempts to create surveys that accurately collect data on teaching practices and techniques. It is with the Internet as well as monitored testing that we find data to analyze and create indicators of well-executed techniques. It is on the basis of state standards that the surveys try to collect data on the teacher and student performance and assessment. It is necessary to compile raw data and understand how it becomes useful information, setting up the surveys so that it is intertwined with state standards. The data must be inputted and processed with programs created to analyze it accurately, which turn out charts and graphs that are given back to the schools for further study.

MEASURING AGREEMENT IN MEDICATION REGIMENS BETWEEN ENGLISH AND SPANISH SPEAKING PATIENTS

Adriana Rosales and Betty Chewning (Mentor), Pharmacy

Measuring Agreement in Medication Regimens between English and Spanish Speaking Patients Adriana Rosales and Betty Chewning (Mentor), Pharmacy Abstract This explores the relationship between patients and their physicians, in order to learn if they agree about prescription medications. The project is located in the pharmacy department, a location that lets us closely study patients' concerns. In addition, the project compares and contrasts English speaking and Spanish speaking patients. In order to determine the relationship between the patient and their physicians we will use reliable coding methods. I will analyze the conversations and answer various questions, such as How comfortable does the patient feel with their physicians? Contrasting the patients who speak different languages will help the pharmacy department figure out if there is a gap between physicians' care of English versus Spanish-speaking patients.

MEASURING PRESCHOOLERS' FRIENDSHIP PERCEPTIONS

Kohisha Blaylock and Robert San Juan (Mentor),
Human Development and Family Studies

The purpose of this research is to develop a measure for examining preschoolers' friendship perceptions and to see if their external perceptions cohere with their teachers'. To examine friendship perceptions, children were videotaped participating in a storytelling task where they developed narratives about a particular friendship. For external validation of the children's narratives the teachers answered questionnaires about their student's friendships. My role in this project is to transcribe the videotaped story tasks of the children. Studying early childhood friendships could help identify precursors to positive and negative social relationships and/or experiences later in life. Early validation could help early childhood educators identify unfavorable social behaviors, and pinpoint areas for teaching positive social skills.

MEDIA EFFECTS: PRESIDENTIAL PRIMARIES AND THE POWER OF THE PRESS

Abigail Peterson and Byron E. Shafer (Mentor), Political Science

The media plays a very real and influential role in American presidential primary elections. To understand press coverage of primary races and the influence it plays in the nominating process, this research project created an analytical framework studying different facets of media coverage in terms of access allotted to candidates, the tone of reporting, and viability judgments about campaigns. This template for studying the media was systematically applied to different modern American primary races and different media outlets. Data was collected from thousands of articles and then coded based on the three established coverage variables. Using that original research and data, the subsequent paper explains what trends have emerged in press coverage of presidential primaries, particularly in terms of frontrunning and insurgent candidates.

MEDIATION OF NEURONAL ACTIVITIES

Hernan Black, Matt Glaser and Mark Brownfield (Mentor),
Comparative Biosciences AHABS

Case study reports link a serotonin reuptake inhibitor fluoxetine (Prozac) with fluid metabolic disorders in aged humans. Serotonin is a neurotransmitter involved in numerous brain functions including behavior and metabolic regulation. This project will determine the effects of fluoxetine on dehydration-induced signal transduction in aged rats. Our focus is to localize regulatory receptors and linked signal transduction pathways in specific locations of a rat brain in animals treated with 10 mg/kg/day of fluoxetine. This will help to better understand how fluoxetine affects neuroendocrine processing in the aged, and will help to learn how to eliminate side-effects of fluoxetine. We also hope to get a further understanding of serotonin and its roles in the central nervous system.

METABOLIC ACTIVITY OF ARTICULAR CARTILAGE: AN IN VITRO CHARACTERIZATION

Julie Sauer and Lee Kaplan (Mentor), Orthopedics and Rehabilitation

A trend in sports medicine research has been to utilize cultured articular cartilage in vitro to quantify the effects of defined treatments on the metabolism of chondrocytes. This study characterized the metabolism in culture over time, as measured by proteoglycan synthesis. Additionally we investigated results of culturing the cartilage while on the subchondral bone for extended time (defined as organ culture). Two important conclusions can be reached from this data. First, the decrease in metabolic viability correlating with additional days of organ culture suggests the importance of beginning experiments soon after surgical explantation. Second, the significant continual increase in metabolism over time demonstrates the need to reference a control sample at each time point tested, rather than solely referencing the basal levels.

METHODOLOGY FOR IDENTIFYING NEAR-OPTIMAL INTERDICTION STRATEGIES FOR A POWER TRANSMISSION SYSTEM

Eli Gratz, Naraphorn Haphuriwat, Wairimu Magua, Kevin Wierzbicki and Vicki Bier (Mentor), Industrial and Systems Engineering

Given an electrical transmission system (the IEEE Reliability Test system, 1996), we will explore how to identify near-optimal interdiction strategies based on the intentional elimination of transmission lines and buses. The goal is to approximate the smallest number of disrupted lines and buses needed to result in a given number of MWs of unmet demand. We will also attempt to identify interdiction strategies that would result in cascading failures of the power system. The possible interaction with other critical infrastructure systems will also be discussed. By approximating the optimal attack strategy of a terrorist, we may better allocate scarce resources and create policy decisions. We will put this project in context with other methods for vulnerability analysis that have been proposed.

MICROCT COLONOGRAPHY FOR POLYP DETECTION IN AN IN VIVO MOUSE TUMOR MODEL

Khalid Abdul and Jamey Weichert (Mentor), Radiology

This study was initiated to evaluate the accuracy of using air as a contrast media in an established mouse model of colon cancer. High-resolution microCT images were obtained following bowel preparation by injecting air into the rodents' colons. This process is known as microCT colonography or virtual colonography (VC) when performed 3-dimensionally. Experienced gastrointestinal radiologists at University of Wisconsin Hospital interpreted the images for cancerous polyps. Next, the excised colons were rescanned and used as a reference standard. Air, a cheap and accessible contrast agent, holds promise for noninvasive in vivo monitoring of colonic tumors' response to therapeutic treatments. Monitoring tumor response to experimental treatment regimens (chemo ... etc) in preclinical models (rodents) and translating those findings into subsequent clinical trials remains our final aspiration.

MISSION POSSIBLE: PARENT AND CHILD COMMUNICATION AND HEALTH RISK BEHAVIOR

Yaribel Rodriguez and Susan Riesch (Mentor), Waisman Center

The main research goal is to reduce youth participation in health risk behavior. We propose that with increased positive parent-child communication a child will be less likely to partake in health risk behavior as they make the transition from childhood to adolescence, when they are most vulnerable to initiate in health risk behavior. We will randomly select schools in two school districts and work with the fifth graders, transitioning from elementary to middle school and their families. The schools will randomly be placed in the control or intervention group. The schools in the intervention group will participate in the Mission Possible program, a six-week program that has benefits on adult-youth communication. Observations will occur over six periods. We expect the project to take three years, which allows sufficient time for the child to experience developmental change as they transition from childhood to adolescence.

MOLECULAR ENERGETICS AND THE DOCKING MESH EVALUATOR

Erick Butzlaff and Roummel Marcia (Mentor), Biochemistry

One of the greatest challenges facing biophysicists is the formulation of a computationally feasible description of the physics involved in molecular interactions. An accurate model of molecular energetics is widely considered to be the key to effectively simulating little understood processes like protein folding, protein docking, and molecular dynamics. The Docking Mesh Evaluator software package employs one such model in an optimization-based approach to the prediction of protein-protein interactions. The speaker will present his revised model and compare his findings to those of other models.

**MOTHERS' INTERACTIONS WITH
CHILDREN DOING MATHEMATICS:
LINKS TO SOCIOECONOMIC STATUS AND GENDER**

Liza Hirsch and Janet Hyde (Mentor), Psychology

In a society divided by socioeconomic status and gender, researchers must examine environmental influences beginning in childhood. Research has inadequately addressed how the home environment contributes to gender and SES discrepancies in children's mathematics performance. This study examined how family's SES and child's gender related to how mothers taught their children math problems in the home. Statistical analysis was computed through a 3 X 2 ANOVA, with SES and child's gender as the IVs. The DVs were a series of coded teaching variables. Results indicated that in terms of teaching conceptually low SES mothers displayed more gender-differentiated behaviors than middle or high SES mothers. The main implication was the importance of school-parent partnership in fostering equal home learning environments and more positive attitudes toward mathematics.

**MY FAVORITE BOOK:
A UNIQUE LITERACY PROGRAM FOR STUDENTS IN THE
SAFE HAVEN AFTER SCHOOL PROGRAM**

Joseph Agoada and Ann Lundin (Mentor),
School of Library and Information Studies

A unique and innovative literacy program that enhanced the reading skills of 3rd and 4th graders with a combination of art, music, reading, and creative writing. MFB worked with students from the Safe Haven Afterschool Program. Classes were held for two hours, twice a week, in the Lowell Elementary School Library. The first half of the program included a variety of activities including: reading hip-hop lyrics, imaginative writing and art exercises, and field trips to the Wisconsin Center for Book and Paper Arts, Circle Park and the University of Wisconsin-Madison Campus. The second half focused on collaborating on an original children's book entitled

**NEUROTRANSMITTER MEDIATORS OF
FEEDING CONTROL**

Shannon McChesney and Mark Brownfield (Mentor),
Comparative Biosciences

Glucagon-like peptides (GLP) 1 and 2 are primarily expressed in the gastrointestinal tract. It has been suggested to exist in the brain also. GLP-2, via its receptor, is responsible for regulating cell proliferation, nutrient absorption and limiting food intake. The primary objective this research is to map the GLP-2 and its receptor distribution in rat brain. The secondary goal is to map their interrelationship with other neurotransmitters that it interacts with, particularly serotonin and neuropeptide Y. To map these transmitters and receptors we will use immunocytochemistry. First, a primary antibody against the brain molecule is applied, followed by a fluorescent-labeled second antibody which binds to the first antibody. This lets us visualize the location of the receptors or neurotransmitters due to their glowing bright colors under the fluorescent-microscope. While viewing under the microscope, we map the distribution of these constituents with a standard rat brain atlas.

**NEWS COVERAGE OF
THE ISRAELI/PALESTINIAN CONFLICT**

Muzammil Hussain, Mona Mogahed and Douglas McLeod (Mentor),
Journalism and Mass Communication

Maintaining objectivity in conflict-coverage is one of the most important—and most challenging—duties of a reporter. Everyday, millions of people rely on The Associated Press' newswire to form their views about the Israeli-Palestinian Conflict. As a democracy and superpower, perceptions and choices of the American public affect not only millions of Americans but also billions all over the world. Our analysis covered AP articles from 2000–04, a period which saw very intense fighting. We examined a total of 204 articles, noting factors that may indicate bias, such as perpetrator/victim portrayal, sentence structure, and framing. It is our hope that this research will assist in the accurate and unbiased coverage of the Palestinian-Israeli Conflict.

OLDER WOMEN’S STRATEGIES FOR COMMUNICATING WITH HEALTH CARE PROVIDERS

Emily Powers and Sue Heidrich (Mentor),
UW Comprehensive Cancer Center

The objective of this project was to learn older women’s strategies for communicating with health care providers about symptom management. Symptoms have been linked to poorer quality of life, but little is known about how older women communicate with their providers about their symptoms. This project uses data from an ongoing randomized clinical trial testing a nursing intervention. Women are interviewed about their symptoms, goals, and strategies to achieve these goals. A content analysis of field notes from interviews was conducted to identify themes across subjects to describe the process. Seven common themes were identified, coded, and tested for inter-rater reliability. Older women use multiple communication strategies with their health care providers to address symptom management. Further research is needed to determine effectiveness of strategies.

PERFORMANCE ANALYSIS OF AN ACUATED CONTROLLED INTERSECTION USING HARDWARE-IN-THE-LOOP SIMULATION

Nghia Le and Xiaozhao Lu (Mentor), Civil and Environmental Engineering

Digital computer simulation offers a powerful tool for the study of complex systems such as traffic network. When a system is too complex to analyze, simulation is the only way to analyze systematic configurations or control strategies before they’re implemented in the field. Improvements in computers have given us the ability to model large systems with short simulation-running-time. As a result, traffic engineers utilize computer models to evaluate, or test how well a highway facility will operate under a given traffic demand. These simulations allow a traffic engineer to examine a complex traffic signal timing plan with advanced traffic controllers before the plan is implemented in the field. Through the use of simulation, this research will help find ways to improve different traffic networks.

POLITICS FOR US—FOSTERING YOUTH CIVIC ENGAGEMENT THROUGH RADIO

Erin Rushmer and Katherine Cramer Walsh (Mentor), Political Science

“Politics for Us” was an effort between me, Professor Katherine Cramer Walsh, and WSUM student radio to foster political and civic participation among 18–25 year olds in the Madison community. The project, funded in part through a Wisconsin Idea Fellowship through the Morgridge Center for Public Service, involved a weekly radio show of the same name which focused on issues surrounding the 2004 elections with an emphasis on how these issues are relevant to young adults. Featured guests included community leaders, UW student leaders, political representatives, and UW faculty members. The project aimed to encourage political and civic participation among young adults by informing them about the relevancy of political and community issues to them and by showing them that their participation can affect these issues.

PRIMARY PREVENTION OF EATING DISORDERS IN MIDDLE SCHOOL STUDENTS

Sara Romanski and Susan Riesch (Mentor), Academic Affairs

The purpose of this project is to develop and provide a universal preventive intervention of eating disorders in late elementary and middle school students. This intervention was developed following a survey as part of research completed by Susan Riesch. The health risk behavior, trying to lose weight quickly, was reported by almost one-fourth of fifth grade students. The intervention includes education about anorexia and bulimia nervosa; risk factors, effects, and possible causes of eating disorders; tips for healthy eating; and positive body image and self-esteem. Four groups of around thirty students attended the presentation and participated in body image exercises and discussion. Evaluation forms were collected to determine what students learned from the presentation and what questions they still had regarding eating disorders.

**PROGNOSTIC VALUE OF ELEVATED TROPONIN IN
NON-CARDIAC PATIENTS AND
ITS IMPACT ON CLINICAL PRACTICE**

Mai Thao and Su-Min Chang (Mentor), Internal Medicine

The purpose of this research is to determine if the elevation in troponin I significantly predicts outcomes of patients suffering from a cardiovascular disease. Troponin I is a protein in muscle cells that binds to calcium, allowing muscles to contract. Troponin I level increase when there is injury to the heart muscles. We will study patients admitted to the hospital with Acute Coronary Syndrome (ACS). Our research involves a medical chart-review study of two groups: patients admitted with prior diagnosis of ACS and patients admitted without previous diagnosis of ACS. From our analysis, we will be able to identify non-ACS patients who will be at high risk for developing ACS. Ultimately, we hope to develop a new therapeutic way to treat high-risk patients.

**PURIFICATION OF MA2.1
FOR ANALYSIS OF ANTIGEN COMPOSITION**

Vignesh Packiam and Lynn Haynes (Mentor), Surgery

Transplant rejection is due to genetic differences between a donor and recipient, which are expressed by human leukocyte antigen (HLA) differences. We purify MA2.1, an antibody, which recognizes HLA-A2, an important HLA protein. The laboratory buys cells which perpetually produce MA2.1. Then the cells are grown and its tissue culture supernatant is passed through a column to isolate the antibody. Afterwards, the MA2.1 can be eluted off the column by using an acid to break bonds. We are currently searching for the most efficient elution and purification method. This is important since reagents like the MA2.1 antibody are crucial for experiments that explore transplant tolerance. The project goal is to purify antibodies for determining donor/recipient HLA type matches that cause tolerance.

**RANKING THE NATIONAL
BASKETBALL ASSOCIATION TEAMS**

Shiming Feng and Wei-Yin Loh (Mentor), Statistics

We consider the opposing team for each game as an important part of ranking a basketball team. I compiled the data and game results from the two previous seasons in the format that we need. I then ranked the teams based on my knowledge of the game and the teams. Using my ranking and that published by the NBA, Professor Loh used a regression tree method (a modern statistical technique) to obtain a prediction formula for each ranking for the current season. The regression trees show that line—the number of points that the experts think each team would win/lose by in each game—is the most important variable in the formula. We are now forecasting the final standings of all thirty NBA teams for this season by averaging the game predictions.

**REINFORCING IMPORTANT LIFE SKILLS AT
THE HOPE HOUSE**

Ashley Sprangers and Kathleen Todar (Mentor), Social Work

This project is designed to address the prevalent issues of teenage mothers and homelessness. It revolves around the idea that everyone can make changes in their lives with a little direction. The goal is to develop and implement a set of informal lessons and activities that will reinforce essential life skills. Included in these are stress reduction, job readiness, nutrition, money management, and self confidence. The project will run weekly throughout the spring semester. Each week will consist of cooking dinner together as a group, which will be followed by a learning activity. I will explore the effects of the activities on the women's outlook, and hopefully they will walk away with a renewed sense of confidence along with the essential skills that will support them in their future.

RIDING FREELY: THE JOURNEY TO A MORE BIKE-FRIENDLY COMMUNITY

Katherine Tully and Gerry Campbell (Mentor),
Agricultural and Applied Economics

I would like to showcase my service-learning project that I am doing for Gerry Campbell's class CALS InterD 393. I have been working with the Bicycle Federation of Wisconsin to help them organize and implement a week-long series of events for their annual Bike to Work Week which will take place May 14–20, 2005. We are planning the Art Bike Parade, Breakfast for Bikers, Bike to School, Bike to Worship, Bike to Work and the Final Fiesta among other things. I am helping to coordinate volunteers, gather sponsorship from local businesses, and recruit schools to participate. In conjunction with my project I meet with my faculty sponsor once every two weeks, keep a weekly journal and I am enrolled in a class entitled Social Movements and Grassroots Politics.

ROLE OF TRANSFORMING GROWTH FACTOR-BETA IN INFLUENZA INDUCED NITRIC OXIDE PRODUCTION

Jason Wojcechowskyj and Stacey Schultz-Cherry (Mentor),
Medical Microbiology and Immunology

Since 1997, highly pathogenic strains of avian influenza (H5N1) have crossed the species barrier causing human disease and death. The reason for the enhanced virulence is unknown. The lethal H5N1 strains failed to activate transforming growth factor-beta (TGF-beta). We hypothesized that TGF-beta was required to control viral-induced inflammation; specifically the production of nitric oxide. Thus, we determined the role of TGF-beta on levels of nitric oxide produced during influenza infection. Upon infection with virus, levels of TGF-beta will be modulated and nitric oxide production measured in two ways: in vitro, supernatants of infected macrophages will be tested by Griess assay. In vivo, mouse tissue will be stained for nitric oxide. Results of these studies will shed light onto a possible mechanism for the enhanced virulence.

ROLES OF RHO ACTIVATED KINASE AND CITRON KINASE IN CELLULAR WOUND HEALING

Andrew Clark, Kara Wong and William Bement (Mentor), Zoology

Previous studies suggest that Rho activated kinase (ROK) and citron kinase (CK) are downstream effectors of the small GTPase RhoA in cytokinesis. Because the mechanism of cytokinesis is closely related to cellular wound healing and Rho is activated in cytokinesis, we propose that ROK and CK are also players in wound healing. We will characterize their roles in wound healing by using gfp-tagged probes, overexpressing ROK and CK, and injecting dominant negative and constitutively active forms of the enzymes. Preliminary results suggest that both kinases are involved in wound healing. Results gathered in this study may help to determine the roles ROK and CK in actomyosin ring formation and contraction in cellular wound healing, which would contribute to the understanding of this mechanism and cytokinesis.

ROMANTIC CIRCLES GALLERY

Timothy Leonard and Linde Brady (Mentor), Art History

The Romantic Circles Art Gallery is an on-line collection of visual art from the Romanticism. The gallery will provide educators and the general public an internet-based reference catalogue of Romantic art. A compilation of 100 pieces have been selected for research of metadata. The metadata will provide detailed information on each individual art piece and will describe its relevance to Romanticism. The history and information on the visuals will be compiled from art journals, exhibitions, the museum or owner, catalogue raisonnés, and various other scholarly references and resources. The artwork itself will be digitized and licensed for publication and viewing on the website. Upon completion, the Romantic Circles Art Gallery will be a comprehensive on-line museum giving easy access for researchers and scholars.

SCREENING OF ARABIDOPSIS THALIANA ACCESSIONS FOR SENSITIVITY TO VERNALIZATION

Riamsalio Phetchareun and Christopher Schwartz (Mentor), Biochemistry

The purpose of this project is to screen accessions of *Arabidopsis thaliana* to assess natural variation in sensitivity to vernalization, the promotion of flowering by exposure to cold. Specifically, we are testing a worldwide collection of accessions for vernalization response for different time periods. The accessions are scored for flowering time after a 0, 14, 42, or 70-day vernalization periods. Current results show there are accessions that flower earlier, while other accessions appear to not respond to the vernalization treatment. Those accessions that show a response to vernalization will be further investigated in subsequent projects in hopes that it will help gain a better insight into understanding the molecular mechanisms that control flowering.

SEARCHING FOR CARMEN MIRANDA

Whitnee Smith, Rebecca Zepeda and Kathryn Sanchez (Mentor),
Spanish and Portuguese

Our project is a close examination of the reception of the Latina actress of the 1940s, Carmen Miranda, in the United States. We are assisting in examining her role in the U.S. as a cultural icon through looks at her performances and various imitative performances of the actress spread across many genres of entertainment. We also hope to examine popular culture entertainment's issues with gender, sexuality, and ethnicity. The end result is a hopes to spread knowledge of Miranda to a larger audience so that she is no longer an unidentified figure in U.S. culture, particularly involving film.

SELF EFFICACY AND ATTITUDES TOWARD MATH: IMPACT OF A TUTORING PROGRAM

Danielle Ries and Molly Carnes (Mentor), Medicine

The project is a collaborative effort to encourage mathematics interest and achievement in Wright Middle School students. During the course of the project, I tutored students in mathematics, introduced an incentive program, and evaluated the students' math self-efficacy and their attitudes toward math. I tutored them in current class work and gave them incentives to review and become proficient in skills such as multiplication and long division. The project focus was to improve their math self efficacy through both

internalization of motivation, and actual skill improvement, also, giving the students the extra attention they need to do better in their math classes now and in the future.

SELF PLAGIARISM: LABOR, LOSS, AND LONGING IN STUDENT WRITING

Sophia Estante and Emily Hall (Mentor), English

By exploring the seemingly paradoxical question of whether students can plagiarize their own writing, this research looks at the theoretical, rhetorical, and pedagogical implications of the common university policy that considers the act of handing in the same paper (whether revised or not) for more than one class plagiarism. The significance of this research is a new differentiation between revision, the type commonly encouraged by writing center staff and professors and takes place within a few days or a week, and long-term revision, or revision that extends past a semester and perhaps takes years. Acts of self plagiarism may actually foster the later type of revision, which arguably results in greater student investment in their writing.

SELF-REGULATION AND EFFORTFUL CONTROL IN 24-MONTH-OLD CHILDREN

Lisa Kaelin and Julie Poehlmann (Mentor),
Human Development and Family Studies

This project stems from Dr. Poehlmann's longitudinal research study: "The Development of Self-Regulation in High Risk Infants." The informational project provides greater detail on the components of self-regulation and effortful control in 24-month-old children. Self-regulation is the measure of the child's capacity to regulate emotions, attention, and behavior. Closely linked is effortful control, the child's ability to suppress their preferred action and show a less dominant action. Around the age of 24 months, children begin to display this with compliance. Within this presentation, problems with self-regulation will be displayed as well as the various ways that self-regulation is assessed through this research study

SEXUAL ASSAULT IN THE LESBIAN, GAY, BISEXUAL, TRANSGENDER (LGBT) COMMUNITY

Kristen Bertling, Amanda Evenstone, Leah Stoecker and
Anne Enke (Mentor), Women's Studies

Sexual assault, defined as any unwanted sexual contact that elicits a traumatic response, is a pervasive issue in all communities, including the Lesbian, Gay, Bisexual, and Transgender (LGBT) community. Due to the underreporting of sexual assault, especially in minority communities, we set out, with the aide of Anne Enke and the Rape Crisis Center, to develop a better understanding about how sexual assault affects the LGBT community. After collecting relevant preexisting data and conducting a series of interviews, we will synthesize our information into an article and pamphlet. This pamphlet will provide information to the community as well as resource facilities to raise awareness and refine counseling services throughout the state. The article will serve as an academic resource regarding both the struggles that an LGBT survivor faces and the tools that he/she found most beneficial in the process.

SHADOWS OF THE ENLIGHTENMENT: THE MAGIC LANTERN AND TECHNOLOGIES OF PROJECTION

Christina Sours and Jill Casid (Mentor), Art History

This project explores the role of the magic lantern and related technologies of projection in the production of the European self as a rational subject between 1650 and 1850. This study explores the complicating effect of the technologies for casting an image on the actualization of the idea of the European self as distinct from peoples in other parts of the world, based on European claimed reason and technological mastery. By setting the European subject within the global context of colonized peoples the manuscript argues that the European self-image not only depended upon but was also haunted by contacts between colony and imperial metropolis. My research focuses on the recent controversy surrounding the use of imaging devices in the history of art, and searching for images of optical devices from primary sources to be used in the manuscript.

SOURCES FOR SUPEROXIDE GENERATION IN AXOTOMIZED RETINAL GANGLION CELLS

Mark Hoegger and Leonard Levin (Mentor),
Ophthalmology and Visual Sciences

Retinal ganglion cells (RGC) undergo apoptosis after axotomy. Our prior studies demonstrated that reactive oxygen species (ROS) play a role in signaling apoptosis after axotomy. The superoxide anion (O_2^-) is an example of a cellular free radical that is a reactive oxygen species (ROS). After axonal injury of RGCs, mainly axotomy, cellular levels of ROS such as superoxide increase. Understanding the cellular processes generating the rise in superoxide would help determine the upstream mechanism by which axotomy induces this signal. Complex III of the mitochondrial electron transport chain may be a source of superoxide generation in RGCs after axotomy, and may represent a target for preventing signaling of apoptosis.

SPRING FLOW AND WATER QUALITY IN THE LAKE WINGRA WATERSHED

Nick Ballering and Jean Bahr (Mentor), Geology and Geophysics

Our purpose was to determine the quantity and quality of spring water flowing into Lake Wingra. We measured the flow of some springs with a dam-like device called a weir. At other sites we took periodic flow measurements using a spinning mechanism called a pygmy meter. We measured quality using a salinity meter and various chemical tests. MG&E is planning to construct a groundwater recharge station near Lake Wingra, which may affect the amount of spring flow into the lake. Our results established baseline measurements of spring flow, which will be compared to later measurements in order to determine the recharge station's effectiveness. In addition, we determined how much the flow rates naturally fluctuate based on precipitation levels and seasonal changes.

STAR-SHAPED AZO-BASED DIPOLAR CHROMOPHORES: DESIGN, SYNTHESIS, MATRIX COMPATIBILITY, AND EO ACTIVITY

Wen Teh and Padma Gopalan (Mentor), Material Science and Engineering

Three new azo-benzene-based push-pull chromophores with dendritic architecture were synthesized as active materials for electro-optic applications. These chromophores were synthesized in six or seven steps with overall yield of around 80% per step and high purity. UV-vis spectroscopy showed significant influence of the transient dipole moment on the observed r_{33} values. The chromophores were stable to photochemical oxidation in ambient light and air. The electrical poling conditions were optimized for each chromophore as the T_g of the composite material varied significantly. The highest EO coefficient achieved was 22-25 pm/V at 1550 nm wavelength. STEM analysis of the blends enabled the correlation of the activity of these large chromophores with the blend morphology. An amorphous polycarbonate host effectively disperses the chromophores in 2-20 nm aggregates in the active materials.

STEROL CARRIER PROTEIN-2 IN MANDUCA SEXTA

Amanda Pitterle and Que Lan (Mentor), Entomology

A Sterol Carrier Protein-2 (SCP-2) inhibitor could be used as a pesticide by blocking cholesterol uptake and transportation within insects' cells. This makes cell membranes unable to function correctly and reduces synthesis of molting hormone. In order to identify SCP-2 in the *Manduca sexta*, degenerate and nested PCR primers will be used to clone *M. sexta* in a fat body cDNA library of the *M. sexta*. The PCR primers are designed based on the sequence of the mosquito SCP-2 gene. Any cDNA clones which are similar to the mosquito SCP-2 gene will be identified via DNA sequencing.

STRAIN DISTRIBUTION PANEL IN HCB/DEM MICE

Thae Yang and Robert Blank (Mentor), Endocrinology

Fragility fractures are an important health problem among the elderly. The contributions of bone mass, geometry, and composition to strength can be studied in concert by 3-point bend testing in a model organism. I determined the cross-sectional moment of inertia, I , for a series of bones that were biomechanically tested to assess the contribution of bone geometry to stiffness

and strength. From the whole bone 3-point bending data and the geometrical measurements I calculated Young's modulus, maximum stress, and toughness. These data reflect the radial dimensions of the cortical bone. By performing detailed biomechanical characterization of bones in a model system, we are able to compare skeletal properties of animals with varied genetic backgrounds, thus providing insight into the genetic determination of bone strength.

STUDY OF TRICHODESMIUM ERYTHRAEUM BACTERIUM K⁺ CHANNEL ACTIVATION MECHANISM

Cristina Betancourt and Yoshiro Saimi (Mentor), Genetics

The purpose of this study is to find how and what activates a K⁺ channel (TerK) of *T. erythraeum* bacterium. We will perform random mutagenesis and expression of TerK in *Escherichia coli* to see if the mutation will affect activation of TerK. When mutants are found, the mutant TerKs' genes will be sequenced and then the mutations will be identified. By correlating the site and nature of mutations with the mutant phenotypes, we hope to find the mechanism through which TerK functions. Those results will lay the foundation for further investigation of how TerK operates. The findings could help influence how channels in the brain work.

SUMMER HOMES, WINTER HOMES, OR PRIESTLY ABODES? EXPLORING STRUCTURAL VARIABILITY AT JONATHAN CREEK

Marieka Brouwer and Sissel Schroeder (Mentor), Anthropology

Archaeological excavations at the Mississippian era (ca. A.D. 1000-1450) Jonathan Creek Site in western Kentucky revealed the remnants of 89 structures within a walled community. Eight of the structures at the site exhibit a pattern of three large interior posts, centrally aligned with the longer walls, which is unique in the Mississippian world. Five hypotheses have been developed to account for the nature of the triple post mold structures: (1) status, (2) structure function, (3) ethnicity, (4) seasonality, and (5) date of occupation. To explore these scenarios, certain characteristics in the material and architectural data will be examined, including the occurrence and frequency of vessel types used for different purposes, and the incidence of trade goods and prestige items.

SUPREME CONSTITUTIONAL COURT AND THE STATE IN EGYPT

Zineb Davis and Tamir Moustafa (Mentor), Political Science

Following the fall of many communist states, authoritarian leaders, still holding roughly half of the world, had to decide whether they could best hold power through oppression or increased openness. The purpose of my research is to better understand the reasons an authoritarian regime, that of Egypt in this case, would establish an independent supreme court, then later undermine its ability to effect meaningful change. The complex society and government of Egypt, and its unique history, provides a fascinating case study. The authoritarian regimes of Nasser, Sadat, and Mubarak pursued different goals in different ways, while facing a weak economy, religious organizations, and foreign nations. Various policies of both openness and oppression have been used in the past, and the future promises to be interesting.

SYNTHESIS AND BIOLOGICAL ACTIVITY OF POTENT VITAMIN D RECEPTOR ANTAGONISTS

Evera Wong and Hector DeLuca (Mentor), Biochemistry

Potent vitamin D receptor (VDR) antagonist (22E)-(24R)-25-carbobutoxy-2-methylene-26,27-cyclo-22-dehydro-1 α ,24-dihydroxy-19-norvitamin D3 (OU72) and derivative (CN67) were synthesized based on Horner-Emmons and Horner-Wittig reaction. Their VDR competitive binding with respect to 1 α ,25(OH)₂D₃ and abilities to induce in vitro transcriptional activities using luciferase reporter gene driven by 24-hydroxylase promoter were evaluated. Results from competitive binding assay indicated that OU72 had a binding affinity equivalent to 1 α ,25(OH)₂D₃ while CN67 was 92 times less potent than that of 1 α ,25(OH)₂D₃. OU2 were found to be a partial agonist and both OU72 and CN67 behaved like VDR antagonists in the transcriptional assay.

SYNTHESIS AND CHARACTERIZATION OF A NOVEL CLASS OF THIOL REDUCING AGENTS

Christopher Schlieve and Leonard Levin (Mentor),
Ophthalmology and Visual Sciences

Shifting the retinal ganglion cell (RGC) redox state towards mild reduction and preventing thiol oxidation is neuroprotective in dissociated mixed retinal cultures in vitro and optic nerve crush in vivo. We synthesized novel modifications of the thiol reductant tris(2-carboxyethyl)phosphine (TCEP) with increased cell permeability and improved chemical stability, and tested their ability to increase rat RGC survival in vitro. At 72 hours, PB1 was effective at rescuing acutely axotomized RGCs at concentrations from 1 nM—100 μ M. RGC survival with 1 nM PB1 was 173 \pm 12% of control ($p=0.002$). At 144 hours, PB1 rescued RGCs at concentrations from 10 pM—1 M. Another compound, PB2 rescued RGCs at 10 pM (177 \pm 20%; $p=0.006$) and 10 nM (251 \pm 34%; $p=0.004$) at 3 days.

TAILORED FAMILY PREPARATION FOR WITHDRAWAL OF MECHANICAL VENTILATION

Jennifer Orth and Karin Kirchhoff (Mentor), Institute on Aging

The purpose of this study is to assess if families can be better prepared for withdrawal of life support. As patients die, they may exhibit signs that can be perceived as distress or discomfort. Using a randomized controlled group design, consenting families received usual care during withdrawal or usual care plus a tailored message outlining possible signs the patient may exhibit. Short term coping of the designated family member was assessed 2-4 weeks after the withdrawal. Upon completion of this study we expect that the preparatory information will have improved short term coping of the withdrawal experience and decreased psychological stress in the experimental group. This information may provide caregivers with evidence-based research and tools to improve families' satisfaction with end of life care.

TERRIBLE BEAUTY

Raven Berry and Jennifer Augus (Mentor), Textile Arts

In the current project Jennifer Angus and I are pinning everything from weevils, to grasshoppers, to moths, and beetles to create a masterpiece that symbolizes the beauty of insects; and how this beauty establishes a wonderful pattern known as “toile.” Angus uses this eighteenth-century pattern to attempt to make science through anthropomorphizing of insects. From this project I plan to gain a sense of creativity with the insects.

THE 2004 PRESIDENTIAL ELECTION CAMPAIGN— A GLOBAL PERSPECTIVE

Kimberly Lammi, Yphtach Lelkes, Patrick Peczerski, Jerilyn Teo and Denise St. Clair (Mentor), Journalism & Mass Communication

As part of AMP: Analyzing Media Perspectives, we conducted an analysis of domestic and international newspapers concerning the 2004 Presidential Election Campaign. The research involves a quantitative content analysis of front-page news articles published October 1, 2004 through November 5, 2004. Specifically, this analysis is focusing on sources quoted and issues covered. Qualitatively, the study focuses on article framing and issue prominence. Through this, AMP is studying whether or not the domestic and international press provided readers with diverse perspectives in an effort to promote media literacy and to encourage critical reading of the media, as well as informed decision-making. And, by evaluating international media, we are able to gauge international public opinion as well as locate sources Americans can turn to for diverse perspectives.

THE EFFECTS OF COMMUNITY OUTREACH ON RESEARCH

Laceasa Curtis and Linda Oakley (Mentor), Nursing

The African American Health Network Have A Heart project is a community outreach study of cardiovascular disease in the African American community. The purpose of my interview study was to learn the answers to three specific questions 1.) What is community outreach? 2.) How is community outreach research beneficial to the African American community? 3.) What are the strengths and weaknesses of community outreach? I plan on interviewing the principal investigator, project director, and the key members of

the research team. I plan on learning that community outreach research allows people who have limited access to healthcare the opportunity to be educated on their risks for cardiovascular disease. This research will give insight on a research method that is seldom used, but improves the health of our community.

THE ART OF CHANGE

Melissa Cooke and John Hitchcock (Mentor), Art

This collaborative project between Clean Wisconsin, Assistant Professor John Hitchcock, and myself that researched environmental issues, investigated non-toxic, ecologically friendly methods of making art, provided environmental education to the public, financial support to Clean Wisconsin, and artwork to the community. Through collaboration with Clean Wisconsin, I designed and printed seven illustrations that address environmental issues in our community using ecologically conscious print-making processes. The illustrations were distributed throughout Wisconsin, urging residents to take responsibility for our health and that of our environment and get involved with saving our natural resources. Information regarding the environmental and health impacts of art materials was relayed to the University, urging printmakers to use more health conscious ways of printing.

THE CHEMOPREVENTIVE EFFECTS OF EGCG

Emily Gurnee and Hasan Mukhtar (Mentor), Dermatology

Green tea has recently been shown to possess many powerful antioxidants possessing chemopreventive and chemotherapeutic effects. One of the most powerful components of green tea is Epigallocatechin gallate, or EGCG, which we believe plays an integral role in the chemopreventive effects of green tea. EGCG inhibits the NFkappaB pathway, which has been linked to cancerous cell development. We tested EGCG's efficacy in blocking the NFkappaB pathway on cells treated EGCG and exposed to cigarette smoke condensate (CSC), a common carcinogen, to test our hypothesis. Our studies have proven that EGCG interferes with the NFkappaB pathway in cells exposed to CSC. We hope to propose an increased consumption of green tea as an easy and effective way to prevent many types of cancer in humans.

**THE EFFECT OF
CHOLESTEROL LOWERING MEDICATION ON
BIOMARKERS OF ALZHEIMER'S DISEASE**

Zachary Clark and Cynthia Carlsson (Mentor), Geriatrics and Adult Development

Alzheimer's disease (AD) currently affects 4 million Americans and that number is expected to increase due to an increasing number of elderly populations in America. As part of The Memory Research Program of the University of Wisconsin Medical School, our research focuses on the effects of simvastatin, a cholesterol lowering medication, on several biomarkers for AD. These biomarkers include specific cholesterol measurements and levels of beta-amyloid, a protein in the cerebrospinal fluid. By collecting data from adult children of AD patients who are at high risk for developing the disease we are analyzing changes in these biomarkers and also changes in memory test scores. We hope that the results of our studies will bring us closer to finding a prevention of Alzheimer's disease.

**THE EFFECT OF GENDER ROLES ON
LEADERSHIP POSITIONS IN A SMALL TOWN**

Tammy Krukowski and Virginia Sapiro (Mentor), Women's Studies

By growing up in a small town, in my experience and the experiences of those around me, gender roles are more strictly enforced in the rearing of children (men are to be masculine and earn money while the women are to stay home). For my project, I will interview several different women from my hometown that are in some sort of leadership position to see whether or not they were raised in a similar fashion and the effect it has had on the positions that they currently hold. I will also ask them to give some advice to other women in similar positions.

**THE EFFECT OF HOUSING GROWTH ON OVENBIRD
HABITAT AND POPULATIONS FROM 1970 TO 2000**

Aaron Wunnicke and Christopher Lepczyk (Mentor),
Forest Ecology and Management

Habitat loss and fragmentation are often considered among the main factors responsible for the decline of Neotropical migrant birds. A common cause of habitat loss and fragmentation is housing growth that spreads into the forested landscape. Our study focused on trends in housing density and ovenbird (*Seiurus aurocapillus*) abundance in Massachusetts beginning in 1970. We found a significant relationship (adjusted $r^2 = 0.54$) between housing density and ovenbird abundance. A subsequent linear regression model was used in RAMAS GIS to extrapolate habitat suitability maps of the entire state and explore metapopulation models from 1970 to 2000. The results show a strong decline in suitable habitat in Massachusetts, as well as indicate areas that are important for maintaining long-term population viability of ovenbirds.

**THE EFFECT OF REC A C-TERMINAL DELETIONS ON
THE SOS RESPONSE IN E. COLI**

Simona Rosu and Michael Cox (Mentor), Biochemistry

The RecA protein activates the SOS repair response by binding gaps in damaged DNA. When the C-terminal of the protein is deleted, RecA binds DNA better. Thus bacteria containing C-terminal deletions of RecA are hypothesized to have the SOS response activated even without damage. This study tests this hypothesis by making a construct where a reporter gene is under the control of a SOS-induced promoter. The extent of SOS induction can be measured spectroscopically. The initial attempt to use the RecA promoter resulted in high basal levels, so a second construct was made with the RecN promoter. This showed a large difference between induced and uninduced states, but the positive control did not show a constitutive response. This could be because the SOS response inhibits cell division, favoring the growth of bacteria that may have picked up a mutation in this pathway. Therefore, a third construct is being made in which the growth-inhibiting SulA gene is disrupted.

THE EFFECTS OF MANIPULATING TGF-B1 ON VEIN GRAFT WALL COMPOSITION

Nicholas Heaton and Randal Wolff (Mentor), General Surgery

Autologous vein grafts are the preferred method for many arterial reconstructive procedures. The success of these grafts are limited however, by the development of an irregular cell proliferation within the vessel lumen known as intimal hyperplasia (IH). Transforming Growth Factor-B1 (TGF-B1) is a cytokine that has been implicated in the development of IH. We manipulated the level of TGF-B1 expression using gene therapy. The focus of this study was to determine the composition of the vessel wall as it healed. Using a rat model, vein grafts were placed and treated. Veins were then harvested and analyzed through histochemical methods. Results show that when TGF-B1 mRNA is reduced, there is a reduction of collagen and an increase of muscle cells, which more closely reflects a normal artery.

THE EFFECTS OF SIMVASTATIN ON REDUCING THE RISK FOR ALZHEIMER'S DISEASE

Xuan Wang and Cynthia Carlsson (Mentor), Geriatrics and Adult Development

Our memory research project focuses on how to delay and prevent the onset of Alzheimer's disease. Previous studies have led us to suspect that high levels of cholesterol are correlated with the early onset of Alzheimer's disease. Our clinical studies are of whether simvastatin, a cholesterol-lowering drug, reduces the risk for developing Alzheimer's disease. We have closely monitored our subjects' cognitive functions and biomarkers through multiple verbal and nonverbal memory tests, blood tests, and cerebrospinal fluid tests. Currently, we are in the process of analyzing the effects of simvastatin on the changes of the subjects' memory test scores, biomarkers, and amyloid level from our past studies. Meanwhile, we are starting a new project which incorporates a larger population of subjects and more in-depth memory assessments.

THE EFFECTS OF ST. JOHN'S WORT ON THE FEEDING RATE OF THE ZOOPLANKTON, DAPHNIA MAGNA

Susan Pauer and Caronlina Penalva (Mentor), Zoology

This project studies how the aquatic zooplankton, *Daphnia Magna*, is affected by the natural herb St. John's Wort, an alternative herb used as an anti-depressant. *Daphnia Magna* have been extensively studied due to their high sensitivity to changes in the toxicity of freshwater. Water toxicity directly affects aquatic ecosystems and the surrounding environments and habitats. Ideal conditions are denoted by a set range of *Daphnia Magna*'s feeding rate. Feeding rates are determined by counting the waves created by the zooplankton's thoracic legs when the zooplankton is feeding. An aquatic electrochemistry monitoring system will be used to count the waves. *Daphnia Magna* will be placed into different concentrations of St. John's Wort for a predetermined amount of time. An increased feeding rate is the expected result.

THE HEALTH-RELATED GOALS OF PREGNANT WOMEN

Kimberly Ehlers and Diane Lauver (Mentor), Nursing

Pregnancy can be a unique time for health behavior change. However, there is little research on what health behaviors pregnant women want to address. The study aim was to identify the health-related goals of pregnant women using a descriptive design. Participants (N=57) were recipients of prenatal care in a clinic setting. An anonymous questionnaire was used to collect information about women's health-related goals, current symptoms, overall health, and background information. Responses were analyzed with content analysis to determine themes. Common goals were: to stay active and maintain energy, healthy weight control, and maintain healthy lifestyle. Many women associated a healthy lifestyle during pregnancy with improved delivery outcomes. The discovery of health-related goals can allow clinicians to tailor interventions to meet women's individual needs, which may have an impact on the prevention of pregnancy complications and improvement of maternal health.

THE PRESENCE OF CD68 POSITIVE MACROPHAGES IN HEALTHY MUSCLE TISSUE

Elizabeth Perron and Barbara Schneider (Mentor), Nursing

This project examines if normal (uninjured) mouse skeletal muscle tissue, specifically area 8 of the LG, contains macrophages that have Cd68 antigens. According to previous research, macrophages in healthy tissue were found to have F4/80 antigens. However, current research contradicts this report. We will take three sections from each of the muscle samples and stain them accordingly; either with PBS (control), F4/80, or Cd68; anticipating to see a greater staining in Cd68 than in the F4/80 samples. Current results show that while a few macrophages do respond to F4/80, a majority of the cells contain antigens for the Cd68 antibody. If Cd68 positive macrophages are found to be in higher concentrations than F4/80, Cd68 may become the new standard antibody used in immunohistochemistry.

THE ROLE OF PREFRONTAL CORTEX IN VISUAL WORKING MEMORY TASKS

Yang Xie and Steven Shelton (Mentor), Psychiatry

As demonstrated by numerous studies, rhesus monkeys are a suitable species with which to investigate human cognitive and behavioral processes. To explore the importance of the functional integrity of the prefrontal cortex for short-term memory of spatial visual information, rhesus monkeys will be used to assess the effects of aspiration lesions of the prefrontal cortex on WGTA testing performance. All monkeys will be tested in delayed matching-to-sample and delayed-response tasks with varying time delays, tasks which are contingent upon either retention of visual information or visual discrimination. Errors and response times will be recorded. The test results of monkeys with bilateral prefrontal cortex destruction will be compared with unoperated controls.

THE STORIES OF RURAL HEALTH IN WISCONSIN

Christopher Miller and John Frey III (Mentor), Family Medicine

This community-based research project is a collaborative effort with the Rural Wisconsin Health Cooperative (RWHC) to describe, from the perspective of residents themselves, some of the challenges to delivering health care in rural Wisconsin. Mailed surveys and phone interviews were used to

obtain quantitative and qualitative data from approximately 500 residents from Wisconsin rural communities. This information was used to paint the picture of the strengths and weaknesses of rural health care in Wisconsin. Results will be shared with the RWHC to improve health care delivery in Wisconsin's rural areas, as well as with the Department of Family Medicine in the University of Wisconsin Medical School to serve as a resource for the training of future physicians likely to serve rural populations.

THE STRANGE SITUATION: AN ASSESSMENT OF MOTHER-CHILD RELATIONSHIPS

Jessica Funk, Hannah Jurowicz, Heather Lesser and Julie Poehlmann (Mentor), Human Development & Family Studies

In our project, we are focusing on one of the components of Dr. Poehlmann's research project titled "The Development of Self-Regulation in High Risk Infants." It is a longitudinal study focusing on preterm infants in the family context. We are presenting information on the Strange Situation, a laboratory procedure used with 16 month old infants to assess quality of the mother-child relationship. Infant behaviors such as proximity seeking, avoidance, and resistance are assessed during a series of separation and reunions with the mother. In this presentation we will describe the Strange Situation, including its origins and use in research, and we will illustrate the procedure and children's reactions with video clips.

THE SUBLETHAL EFFECTS OF CADMIUM ON DEVELOPMENT THE WESTERN CLAWED FROG, XENOPUS TROPICALIS

Dominic Burks and Jason Jackson Gross (Mentor), Wildlife Ecology

The responses of amphibian adults, embryos and larvae to short term high dose of heavy metals have been conducted. *Xenopus tropicalis* embryos and tadpoles were exposed to cadmium (control, 6.25, 25.0, 100.0, 400.0, and 800.0 µg/l, as CdCl₂) in a continuous flow-through dilution system from embryonic stages (Neiwenkoop and Faber stage 6) to complete tail resorption (Neiwenkoop and Faber stage 66). Morphological endpoints such as snout vent length developmental stage and time to metamorphosis was recorded. Additional endpoints such as, the bioconcentration of cadmium was assessed for whole tadpole body burden for each treatment. This is the first chronic study as well as the first heavy metal exposure examining the development of the western clawed frog, *xenopus tropicalis*.

THE TORTURE DRESS

Diana Dewi and Diane Sheehan (Mentor), Environment, Textile and Design

This project was created by weaving washers and yarn on a traditional loom. The washers were looped on cotton and wool yarns as the weft in the weave. The dress makes a beautiful sound as the wearer moves. Although it looks heavy (in fact, it weighs about 15 pounds) and seems as if it might be uncomfortable, it is a functional garment. The looseness of the weave minimizes the weight and the four metal chains support the dress by distributing the weight to make it more comfortable.

THE TRANSFORMATION OF THE GACACA: RWANDA'S SEARCH FOR JUSTICE

Ellen Feingold and Karl Shoemaker (Mentor), History

This project examines Rwanda's gacaca, traditional courts that were co-opted by the official judicial system after the genocide of 1994. This paper considers why the Rwandan government selected the gacaca as the primary tool for reconciliation as well as why they transformed them from traditional to official courts. Sources for this project include an interview with Ambassador Zac Nsenga, Rwanda's Organic Laws, documentary videos of the gacaca, and secondary readings on the history of the gacaca and Rwanda's post-genocide situation. This paper concludes that the overcrowded prisons, destroyed justice system, and need for a tool of justice and reconciliation were the primary causes for the selection and transformation of the gacaca. This research highlights the reasons for and problems associated with transforming a traditional institution.

THE TRAVELING AMERICAN CANON: READING AMERICAN LITERATURE IN THE U.S. COLONIES, 1919-41

Hana Mahuta and Victor Bascara (Mentor), English and
Asian American Studies

The goal of this research is to examine what American Literature texts were read in the Universities of countries in American possession during early periods of American colonization in the 1920s-1930s. My research has focused on the University of Hawaii-Manoa, founded in 1907, during that period of American colonization. In the years of the 1920s and 1930s, infor-

mation regarding this topic is not readily available, and as a result of this, my research has been a more indirect approach. My research has included locating prominent Hawaii-Manoa alumni and tracking down existing texts written by them that may have information pertinent to the research, and examining Hawaii-Manoa historical archives. I also hope to participate in direct correspondence with the University of Hawaii regarding this research.

THE UNIVERSALITY OF EMPATHY: A CROSS-CULTURAL ANALYSIS

Danya Bader-Natal and Maria Lepowsky (Mentor), Anthropology

In an effort to better understand how individuals worldwide are able to relate to the struggles others, an examination of the notion of empathy can offer insight. To approach this broad framework, three reconciliation projects will be examined as case studies. The assumption underlying this approach is that feelings of empathy are present in the reconciliation process. The three case studies are of The Truth and Reconciliation Commission (TRC) in South Africa, "Circle Sentencing" among Aboriginal people in Australia, and "Peacemaking" with the Lac du Flambeau in America. This cross-cultural study will speak to the question of the universality of empathy, while demonstrating similarities and differences worldwide in terms of how these emotions are expressed.

THE USE OF GROWTH HORMONES IN TREATING SCARRED RAT VOCAL FOLDS

Ayesha Hasan and Doug Montequin (Mentor), Surgery

Vocal folds scars can cause many speech difficulties. Research should prove that treating them with growth hormones allows them to regain the ability to vibrate normally. Two sets of rats were surgically given scars on their vocal folds and then one was treated with growth hormones. A third unscarred set acted as a control. After having harvested all three sets of larynxes, they are vibrated and their movements were recorded to produce sine graphs. It is estimated that the treated folds will have amplitudes that are two to three times greater than the untreated scarred folds. This research should shed light on how scarring drastically limits the vibrations of the vocal folds and will pave the way for a possible treatment to this condition.

THE USE OF TRICKSTER NARRATIVES IN LATIN AMERICAN FEMINIST LITERATURE

Anna Stieg and Svetlana Karpe (Mentor), Student Academic Affairs

Trickster narrations are embodiments of irony, humor and cultural transcendence that allow feminist writers of all backgrounds to challenge politics and patriarchy in their culture. In my research, I focus on two authors, Rosario Castellanos and Rosario Ferr, who use tricksters to break patriarchal dominant cultural stereotypes, and explore their Latin-American cultural heritage. Trickster characters, the underdogs of the story, criticize the dominant character through humor, wit and irony, forcing a sense of equality representative of the author's plight for cultural power balance. Questioning authority through irony, tricksters allow the expression of a historically repressed group who challenge cultural norms imposed upon them. This questioning of norms is an important cultural act as it exposes arbitrarily imposed barriers in hopes of inducing social change.

THROWING THE BABY OUT WITH THE BATHWATER

Anna Hillary, Benjamin Taibleson and Kenneth Goldstein (Mentor),
Political Science

This research project examines 2004 presidential election polling in the context of prevailing media impressions of political survey research. The goal of this project is to assimilate vast and disparate literature regarding the accuracy and validity of political polling methodology. Ultimately, we assert that political polls, though subject to human error, are largely accurate and, further, necessary to understanding the state of campaigns and elections in the United States. We show that in order to utilize polls effectively, consumers must understand and appreciate the subtleties of polling data that lie behind the gaudy headline results. Political polls have become enormously prevalent in media coverage and political campaigns, therefore, this research endeavors to find the most effective way to use and understand them.

TIPPING THE SCALES: INVESTIGATING RACIAL DISCREPANCIES IN THE DANE COUNTY JUVENILE JUSTICE SYSTEM

Vivian Intermont and Pamela Oliver (Mentor), Sociology

Dane County reflects national trends of racial discrepancies in the juvenile justice system with minority youth accounting for approximately 62% of the juvenile detention population. In hopes of filling a gap in research on racial disparities, this study examines the extent to which a defendant's race affects their interactions with the system during intake, detention, adjudication, and disposition, while controlling for gender and criminal background. By tracking patterns of change from arrested offenses to charged offenses in a sample of juvenile referrals to the District Attorney's Office in 2002, preliminary findings indicate that for certain offenses, blacks tend to be treated more harshly than whites, confirming discrimination. Hopefully once complete, this study can be used to guide reform within the Dane County juvenile justice system.

TOKENIZING OR REPRESENTING?

Armena Ketchum and James Danky (Mentor), Journalism

Media has hypnotized America in believing that everything on television portrays reality accurately; there are many marginalized groups that contribute to American society, but are not being represented. This project explores local news and advertisements. This project's main focus includes analyzing references to marginalized groups within news and editorial papers. This project will be done collectively with a social justice newspaper, The Madison Observer, analyzing whether media is tokenizing or representing marginalized groups. My methods for conducting this project on-campus newspapers and paying close attention to television commercials and advertisements that include or do not include marginalized groups. Once this project is underway, we plan to make a dominant, but documented statement of how the media conveys a mask of discrimination in advertising.

TOLERANCE INDUCED BY EXPOSURE TO NIMAS

Sarang Patel and Lynn Haynes (Mentor), Surgery

We are investigating the phenomenon of NIMA (non-inherited maternal antigens) in relation to transplantation. We have found that offspring exposed to certain NIMAs in utero and through breast feeding have suppressed responses to NIMAs, and therefore received transplant grafts of the mother's NIMAs that survived longer. We have also seen two strains of the NIMAs in which one promoted transplant acceptance, and the other rejected it. We are trying to understand this phenomena by testing the amount and type of cytokines induced by exposure to NIMA. With better understanding of the phenomena, the same concepts of NIMA can be applied to humans to ensure successful transplantations. Methods used involve flow cytometry to analyze cytokine amounts and types and proliferation assays to test cell concentrations. I hope that the results of these experiments will one day evolve into new methods for more reliable transplantation.

TOWARD DELIBERATE ENGINEERING EDUCATION IN THE WRITING CLASSROOM

Kyle Oliver and Laura Grossenbacher (Mentor), Engineering Professional Development

This study investigated the role of engineering-specific needs in first year writing classes for engineers, particularly UW-Madison's Engineering Professional Development (EPD) 155: Basic Communication. I examined the theoretical rationale for these courses, performed a comparative content analysis on the course handbooks for EPD 155 and English 100, and interviewed EPD 155 instructors. I argue that the skills instructors teach and their methods for teaching them are always determined by the very specific needs of engineering students. Based on my findings, I have proposed an easily-implemented restructuring of this course that stresses its ability to teach students to be not just better writers, but also better engineers.

TRANSCRIPTIONAL ANALYSIS OF TYPE IV SECRETION GENES IN NEISSERIA GONORRHOEAE

Megan Kiedrowski and Joseph Dillard (Mentor), Medical Microbiology and Immunology

Neisseria gonorrhoeae is the causative agent of the sexually transmitted disease gonorrhea. *N. gonorrhoeae* contains a type IV secretion system (T4SS) responsible for secreting DNA and proteins into the extracellular environment. The T4SS proteins TraI and TraD are thought to function as relaxase and coupling proteins, respectively. Due to their predicted functions and genetic organization, TraI and TraD may play a role in controlling the actions of the type IV secretion system and may be transcribed differently than other T4SS genes. This project will further characterize the roles of TraI and TraD in type IV secretion and help to determine the optimal conditions for DNA and protein secretion by *N. gonorrhoeae*.

TUTORING WRITING ONLINE: A PRACTICAL AND PEDAGOGICAL APPROACH

Matthew Berg and Emily Hall (Mentor), English

Recently, composition scholars have developed cutting-edge technologies for use in the writing classroom. Scholarship on the utility of these innovations considers the way technology, especially the Internet, dramatically changes the way we teach by enhancing the way we interact with students and making writing tutoring more useful for them. In my research, I investigated a method for online tutoring that combines asynchronous comments on written drafts with synchronous instant messaging to discuss these comments. In doing so, I found the quality of online interaction to be vastly improved from methods that consisted of mere asynchronous commentary. Moreover, I found that this online method contained some advantages, including bridging the gap between the conference and revision process and beginning to eliminate problems of difference.

UNDERSTANDING AND CULIVATING THE TRANSITION FROM ARITHMETIC TO ALGEBRAIC REASONING

Lucy Dale and Eric Knuth (Mentor), Curriculum & Instruction

This project seeks to understand the development of middle school students' algebraic reasoning, to understand the conditions and pedagogy necessary to facilitate students' transition from concrete arithmetic reasoning to abstract algebraic reasoning, and to develop professional development designed to support teachers in fostering the development of students' algebraic reasoning. The project's overarching goal is to develop sufficiently detailed accounts of learning and instruction in classroom contexts to guide the design and evaluation of instructional approaches and professional development programs aimed at facilitating students' algebraic development. This study is following a group of 6th grade students through the completion of 8th grade, and is using written assessments and semi-structured interviews of both students and teachers to document and analyze students' development and to understand classroom practices that influence students' development.

UNDERSTANDING CYTOTOXIC T-CELL EFFICACY AGAINST AIDS VIRUSES

Sean Spencer and David Watkins (Mentor), Pathology and
Laboratory Medicine

Each day 14,000 people become infected with HIV, making the development of an effective HIV vaccine one the world's top health priorities. David Watkins' laboratory is attempting to develop a vaccine that elicits cellular immune responses using the simian immunodeficiency virus (SIV)--infected rhesus macaque model. Current evidence suggests that cytotoxic T-lymphocytes (CTL) play an important role in controlling HIV/SIV. However, our understanding of CTL efficacy is limited. To address this problem, we employed a viral suppression assay that quantifies the ability of antigen-specific CTL populations to control viral replication. Using this assay, we compared the antiviral efficacy of two CTL responses, a Tat- and Gag-specific CTL. We found that Tat-specific CTL were at least 18-fold more effective at suppressing viral replication. With further investigation, we will identify those CTL most efficacious against SIV. This information may impact the design of future HIV vaccines.

UNDERSTANDING THE DEVELOPMENT OF MIDDLE SCHOOL STUDENTS' MATHEMATICAL REASONING (ALSO KNOWN AS PROOF)

Erran Daniels and Eric Knuth (Mentor), Curriculum and Instruction

Proof is central to the discipline of mathematics and its practice, yet, proof has not been a central part of school mathematics. Recently, however, many mathematicians and mathematics educators have advocated that proof should be a central part of the mathematics education of all students. The purpose of this study is to trace the development of middle school (grades 6–8) students' competencies in justifying and proving and to understand the instructional conditions that influence that development. This study will follow a group of 6th grade students through the completion of 8th grade, using written assessments, semi-structured interviews, and classroom observations to document and analyze changes in their competencies and to understand classroom practices that influence these changes.

USING A GROUNDED THEORY APPROACH TO INTERPRET THE SOCIAL NETWORK INTERVIEW

Jennifer Mohr and Jon-Paul Bianchi (Mentor), Human Development and
Family Studies

Research has been conducted showing effect of social interaction on maternal psychological distress, as well as the effects of health risk to mother-infant dyad interaction. The current study combines these findings to determine if health risks in premature infants cause maternal isolation, which results in maternal depression and poor dyad interaction. Dr. Julie Poehlmann's Infant Parent Interaction Lab at the Waisman Center uses the Social Network Interview (SNI) to investigate if mothers of preterm infants identify health issues as reasons for social isolation. This summary of analysis begins with the principles of Grounded Theory. Once Grounded Theory is understood, an interpretation of the interview allows trends in the data to emerge. These trends should indicate health risk as cause for isolation.

VALIDATION OF A PRE-CLINICAL PATELLAR COMPONENT TEST FOR TOTAL KNEE ARTHROPLASTY

Mariana Kersh and Heidi-Lynn Ploeg (Mentor), Mechanical Engineering

Currently, no standard test method exists for pre-clinical testing patellar components used in knee arthroplasty. The aim of this study was to develop and validate a physiological patellar component test. Using kinematics and loading research, a test that mimicked deep knee bending activities was constructed. Two different patellar components were tested: Component A manufactured from polyethylene with a metal backing and Component B manufactured from polyethylene only. Clinical research has documented a higher percentage of failures of metal-backed components versus all-polyethylene components. Initial component test results correlate with the clinical histories as well as show similar failure modes documented in literature. These findings indicate that the proposed test method may be used to assist in the design of clinically successful patellar components.

VEGETABLE POLITICK: ENGLISH RURAL LIFE AND ENLIGHTENMENT

Jason Rozumalski and Jean Lee (Mentor), History

The purpose of this project is to prove an intimate, if not causal, relationship between the rural culture of early-modern England and the English Enlightenment. The evolving thoughts and actions of everyday Englishmen and -women in regarding such rural concerns as land ownership, individual responsibility to community and self, as well as the potential to “improve” land as a commodity in the sixteenth and seventeenth century have not yet been explored in relation to their effect on the emerging Enlightenment. By constructing a historical context (specifically through analyzing literature, material culture, and political theory) for the development of social and political philosophies revolving around reason, thrift, and industry, this study creates a previously unavailable, and environmentally-based, alternative to predominantly intellectually-centered interpretations of the English Enlightenment.

WOLVES IN OUR MIDST: AN ONGOING STUDY OF WOLF IMPACT IN WISCONSIN

Lisa Michl and Charles Snowdon (Mentor), Psychology

The Wolf Damage Program is a sub-section of the Wisconsin Wolf Project, which aims to compensate people who lose their livestock, pets, or hunting dogs to wolves. The Wisconsin Department of Natural Resources has been conducting this research since 1984. My current work involves totaling the money paid annually to people across Wisconsin, along with recording the cause, damage, and location of the claim. The data is used to locate problem areas where wolves kill or injure people’s property, and to show the public that few livestock/pets are killed or injured by wolves compared to the total number of livestock/pets in that area. The goal of the project is to prove that not all wolves are a problem, and that humans and wolves can coexist.

WOMEN AS LEADERS IN THE CONSTRUCTION INDUSTRY: MY MOTHER AS A CASE STUDY

Abigail Rogers and Virginia Sapiro (Mentor), Women’s Studies

I did some preliminary research on current trends within the construction business and how women have negotiated being in a traditionally male-dominated occupation. I then conducted an oral history with my mother in which I interviewed her about her experience not only as a woman carpenter but as a woman leader of a small construction company as well. I used what I discovered during my preliminary research to inform the questions that I asked my mother. Finally, I did some more intensive research in which I further examined specific, interesting things my mother stated during the interview and drew broader conclusions regarding my topic. These conclusions appear in my table display at the Undergraduate Symposium. I also show a video of my interview with my mother as part of the display.

WORKERS' RIGHTS: LEARNING THE PROBLEMS, FINDING THE SOLUTIONS

Lindsay Enters, Rebecca Mergen and Gerry Campbell (Mentor),
Agricultural and Applied Economics

This semester, we are volunteering at the Interfaith Coalition for Worker Justice (ICWJ) in the Workers' Rights Center (WRC); a bilingual organization that works with issues and campaigns to improve wages, benefits, and working conditions for area workers. We will be engaged in a variety of projects in different capacities to improve the labor rights of Madison's low-wage workers. The magnitude of this issue mandates that we learn labor law, act as advocates, and participate in macro-campaigns. Our goal is to assist in the realization of ICWJ's mission, by creating an organized model for new advocates to be trained. Rebecca will be focusing on compiling a Spanish-English vocabulary booklet as a helpful resource to new volunteers with useful words and phrases for this type of worker advocacy. Lindsay will be working on small projects throughout the WRC, helping the director to become more organized and creating a set role for English-only speakers within this organization.

WRITING CONVERSION: DEFINING THE NATURE OF DOROTHY DAY'S RELIGIOUS CONVERSION

Eva Ringstrom and John Tiedemann (Mentor), English

This paper examines the relationship between writing and religious conversion in the life and work of Dorothy Day, journalist, essayist, novelist, and founder of the Catholic Worker movement. Accounts of the conversion narrative genre often rely upon an unexamined distinction between the experience of conversion and the narration thereof, treating the conversion as the principal event and narration as a secondary interpretation. However, I argue that for Day writing is inextricable from conversion itself. Through an examination of the metaphor of labor in Day's writings, I show that for her the act of writing constitutes an ongoing conversion experience. This paper thus offers both a new perspective on this historical and literary figure and a new understanding of the relation between religious and literary experience.