



2005

Website: 2005 Colby College Undergraduate Research Symposium

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Sixth Annual

Colby Undergraduate Research Symposium

Keynote Speaker

Dr. Sandra Steingraber

Ecologist and Author

Dr. Sandra Steingraber gave the keynote address for the symposium at 7:30pm on **Wednesday, April 27, 2005** in Olin 1.

Contaminated Without Consent: A Human Rights Approach to Environmental Health

In the eyes of an ecologist, a mother's body is the first environment. Sandra Steingraber will explore the ways in which toxic chemicals trespass into this environment—from insecticides in amniotic fluid to flame retardants in breast milk—and the various threat they pose to human development from fetal life through adolescence and old age.


Ecologist, author and cancer survivor, Sandra Steingraber, Ph.D. is an internationally recognized expert on the environmental links to cancer and reproductive health. Dr. Steingraber received her doctorate in biology from the University of Michigan and master's degree in English from Illinois State University. She is the author of *Post-Diagnosis*, a volume of poetry, and co-author of a book on ecology and human rights in Africa, *The Spoils of Famine*. She has taught biology at Columbia College, Chicago, held visiting fellowships at the University of Illinois, Radcliffe/Harvard, and Northeastern University, and served on President Clinton's National Action Plan on Breast Cancer. Dr. Steingraber is currently a Distinguished Visiting Scholar at Ithaca College in Ithaca, New York.

Dr. Steingraber's highly acclaimed book, *Living Downstream: An Ecologist Looks at Cancer and the Environment* presents cancer as a human rights issue. It was the first to bring together data on toxic releases with newly released data from U.S. cancer registries. *Living Downstream* won praise from international media, including *The Washington Post*, *the Nation*, *The Chicago Tribune*, *Kirkus Reviews*, *Publishers Weekly*, *The Lancet*, and *The London Times*. In 1997, Steingraber was named a *Ms. Magazine* Woman of the Year. In 1998, she received from the Jenifer Altman Foundation the first annual Altman Award for "the inspiring and poetic use of science to elucidate the causes of cancer", and from the New England chapter of the American Medical Writers Association, the Will Solimine Award for "excellence in medical communication". In 1999, the Sierra Club heralded Steingraber as "the new Rachel Carson". And in 2001, Carson's own alma mater, Chatham College, selected Steingraber to receive its biennial Rachel Carson Leadership Award.

Continuing the investigation begun in *Living Downstream*, Dr. Steingraber's new work, *Having Faith: An Ecologist's Journey to Motherhood*, explores the intimate ecology of motherhood. Both a memoir of her own pregnancy and an investigation of fetal toxicology, *Having Faith* reveals the alarming extent to which environmental hazards now threaten each crucial stage of infant development.

An enthusiastic and sought-after public speaker, Dr. Steingraber has keynoted conferences on human health and the

environment throughout the United States and Canada and has been invited to lecture at many universities, medical schools, and teaching hospitals. She is married to sculptor Jeff de Castro. They are proud parents of five-year-old Faith and two-year-old Elijah.



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Research Symposium

Colby Undergraduate Research Symposium 2005

April 27-29, Colby College, Waterville, Maine

Keynote Address - Dr. Sandra Steingraber

April 27, 7:30 pm Olin 1

Research Presentations

Thursday, April 28

SESSION I: General Session

1:00-3:00 PM

1:15 pm

Andrew Orr ('05), English

Knowing the Void, Hearing the Sound, and Ordering the Fury: Faulkner's Agency, Through Art, from The Sound and the Fury to Absalom, Absalom!

1:30 pm

Christopher Rodney Yeoh ('05), Religious Studies

The Religious System of the Australian Aboriginals: A Study of the Arranda People of Central Australia

2:00 pm

Rebecca Nisetich ('05), English

Maternal and Cultural Influences on Individual Identity in the Novels of Toni Morrison and William Faulkner

**Smith Room
Session Chair:
Clem Guthro**

SESSION II: HISTORY History Honors Presentations

1:00-3:00 PM

**Hurd Room
Session Chair:
Jason Opal**

- 1:00 pm** **Adam Harvey ('05)**
The Maine Supreme Judicial Court and the Battle Over National Identity During the Civil War
- 1:30 pm** **Aaron Poplack ('05)**
Road Rage: The Turnpike Debate In Dedham, Massachusetts, 1801-1803

***SESSION III:
General Session***

***Whitney Room
Session Chair:
Paul Greenwood***

1:00-3:00 PM

- 1:15 pm** **Timothy Newhouse ('05)**, Chemistry
Rod-and-Panel Macrocycles
- 1:30 pm** **Gabriel Reyes ('05)**, Latin-American Studies
The Continuous Struggle for Representation in the Venezuelan State
- 2:00 pm** **Sean Baron ('05)**, Psychology
An Event Related Potential Study of the Role of Attention and Gender in the Illusory Flash Effect
- 2:15 pm** **Mao Zheng ('06)**, Mathematics
Neural Networks for Mathematical Operations
- 2:30 pm** **Asma Husain ('05)**, Art
Exploring Memories and Imagination

***SESSION IV: GOVERNMENT
Democratization in Latin America***

***Lovejoy 344
Session Chair:
Ariel Armony***

1:00 PM

- Graham Hennessey ('05)**
The Effects of Neoliberal Policy on Economic Inequality in Brazil
- Mike Miller ('05)**
Plurinationalism and Democracy? Bilingual Education and Symbolism at Play in Bolivia

***SESSION V: INTERNATIONAL STUDIES
PROGRAM
International Studies
3:00-5:00 PM***

***Smith Room
Session Chair:
Patrice Franko***

- 3:00 pm** **Justin Dubois ('05)**, International Studies
Extension of National Membership: Government Promises, Immigrant Expectations and the Impact on the Foreign Population in Germany
- 3:30 pm** **Erica Hill ('05)**, International Studies
The Liberalization of Village Banking in Guatemala
- 4:00 pm** **Emily Honig ('05)**, International Studies
Governmental Resistance in International Intellectual Property Rights

SESSION VI: EAST ASIAN STUDIES

***Hurd Room
Session Chair:***

Freeman Scholars**Walter Hatch****3:00-6:00 PM**

- 3:00 pm** **Timothy Saw Sunshine ('05)**, Government
Transitional Justice and Prospect of Reconciliation in Burma
- 3:15 pm** **Jayadev Vadakkanmarveettil ('06)**, Government
Ethnic Cleansing in Burma: How Long, How Many More...
- 4:00 pm** **Jingjing Zhou ('07)**, History
Recovering My Past--for Those Who Should Be Remembered
- 4:15 pm** **Catherine Fillebrown ('05)**, East Asian Studies
Two Contemporary Representations of Honglou Meng
- 5:00 pm** **Matthew M. Meredith ('06)**, East-Asian Studies
Biochemical Research in Japan
- 5:30 pm** **Sarah Eilefson ('05)**, English
Vietnam: Beyond Tim O'Brien's Literature

**SESSION VII: COMPUTER SCIENCE
Honors Presentations****Mudd 405
Session Chair:
Dale Skrien****4:00 PM**

- Chris Ries ('05)**
Automated Identification of Malicious Code Variants
- Russ Spitler ('05)**
Eclipse Java Security Scanner - JSS

**SESSION VIII: GOVERNMENT
Government Honors Presentations****Whitney Room
Session Chair:
Sandy Maisel****4:00-5:00 PM**

- 4:00 pm** **Marc J. Kassin ('05)**
Do Presidential Debates Influence Voter Perceptions? National Election Studies
Comparisons of Viewers and Nonviewers, 1996 and 2000
- 4:30 pm** **Michael Rutherford ('05)**
Presidential Management, Fiscal Policy, and Public Rhetoric: An Empirical
Investigation of Public Discourse and the Federal Budget

**SESSION IX: GOLDFARB CENTER
Corporate Responsibility****Smith Room
Session Chair:
Patrice Franko****5:00-6:00 PM**

- 5:00 pm** **Caitlin McCusker ('05)**, **Alan Ashbaugh ('05)**, **Melissa Landau ('05)**,
Shannon Emerson ('05) and **Jonah Waxman ('05)**, Economics
Corporate Social Responsibility in Latin America

SESSION X: BIOLOGY**Olin 234**

The Cell Cycle and Cancer

***Session Chair:
Paul Greenwood***

7:00 PM

Brian Rodriguez ('06)

Adult and Childhood Leukemia: A Developmental and Fundamental Comparison of AML and ALL

Megan Daley ('05)

Cervical Cancer

Amy Campfield ('05)

Neonatal Neuroblastomas: Causes, Detection, and Treatment of Cancer in Newborns

Noah Hoffman ('05)

Prostate Cancer: The TGF- β Pathway and Treatment

Lily Maltz ('05)

Pancreatic Cancer: The Silent Killer

Christina Pluta ('05)

Breast Cancer: Men Can Get It Too!

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April 27, 7:30 pm Olin 1

Research Presentations

Friday, April 29

SESSION : BIOLOGY
Molecular Ecology

10:00 AM

Dave Civitello ('06) and Steve Markesich ('05)

Molecular Ecology of Wolves and Coyotes.

Olin 335
Session Chair:
Stacey Lance

SESSION XI: AMERICAN STUDIES PROGRAM
American Studies

9:00-11:00 AM

9:00 am **Emma Lynch ('05)**

If You Build it, They Will Come: A History of Changing Notions of Wilderness Along the Appalachian Trail

9:30 am **Nathaniel Hulme ('05)**

Marriage and Family: A Closer Look into the Debate over Same-Sex Marriage

Smith Room
Session Chair:
Margaret McFadden

10:00 am **Karinna Russo ('05)**
Deceptive Simplicity: A Study of Jacob Lawrence's Migration Series

SESSION XII: ECONOMICS
Economics

Hurd Room

1:00-3:00 PM

1:00 pm **Pawel Brodalka ('05)**
Strong Nobility, Weak State: An Institutional Analysis Of Poland's Economic And Political Development In The Middle Of The Second Millennium

1:15 pm **Matthew Bucklin ('05)**
Sources of Market Inefficiency

1:30 pm **Richard Downing ('05)**
Determinants of Contractible Sickness in South Africa

2:00 pm **Warner Nickerson ('05)**
Determinants of Divorce in China

2:30 pm **Emilia Tjernstrom ('06)**
Satan Makes Me Spend My Money ♦ A Study of Street Children's Concept of Money and Economic Behavior, Tangiers, Morocco

SESSION XIII: BIOLOGY
Biology Research Papers

Whitney Room
Session Chair:
Josh Kavalier

1:00-5:00 PM

1:00 pm **Patrick J. Slipp ('05)**
A Study of Innate Immune Function in Fish of the Androscoggin and Kennebec Rivers

1:30 pm **Joel G. Morash ('05)**
Patterns of Respiratory Burst Activity in Zebrafish

2:00 pm **Lydia R. Durant ('05)**
Exploring the Ability of Melatonin to Reduce Oxidative Stress in Fiddler Crab Hepatopancreas Cells

2:30 pm **Jocelyn J. LeBlanc ('05)**
Endogenous Rhythmicity of Retinal Photosensitivity in the Fiddler Crab, *Uca pugilator*.

3:00 pm **Eric S. Luth ('05)**
Determining the Specific Sites and Patterns of Melatonin Production in the Fiddler Crab, *Uca pugilator*

3:30 pm **Dana Gwinn ('05)**
Development of DNA Microsatellites for a Tropical Shrub

4:00 pm **Maureen M. Sherry ('05)**
Overexpression and Purification of the Cereal Grain Proteins TaABF, TaWD40, and AFN1

SESSION XIV:
General Session

Smith Room
Session Chair:
Mark Serdjenian

1:00-5:00 PM

1:30 pm **R. Elliott Katz ('05)**, Art

	Exploration of Structure: Natural Forms in Sculpture and Drawing
2:00 pm	<u>Jane Leary ('06)</u> , Mathematics Women in Mathematics: Ada Lovelace
2:15 pm	<u>Julie Jaenicke ('06)</u> , Mathematics Stretching the Path: Hamiltonian Paths in Graphs
2:30 pm	<u>Hannah Emery ('05)</u> , Sociology Popular Culture and the Child Author
3:00 pm	<u>Caroline E. Williams ('07)</u> , Sociology The Key Suffix: From Network to Networking; The Evolution of a Study of Waterville's Social Service Agencies
3:15 pm	<u>Christopher Surprenant ('05)</u> , Philosophy Cultivating a Good Will: Moral Progress and the Kantian State
3:45 pm	<u>Pawel Brodalka ('05)</u> , Government The Political Ethics of Poland's Communist Security Service, Lustration and Wildstein's List.

SESSION XV: CHEMISTRY Senior Presentations

***Keyes 105
Session Chair:
Julie Millard***

3:00 PM

<u>John Cole ('05)</u> A Biomimetic Tungsten Complex
<u>Yan Kung ('05)</u> Towards the Production of a Mutant S-RNase that Inhibits Self-incompatibility
<u>Galia Debelouchina ('05)</u> Guest-Host Chemistry of Calix[6]arenes
<u>Jonathan Lees ('05)</u> Predicting Guest Host Binding

SESSION XVI: ENVIRONMENTAL STUDIES Environmental Studies

***Hurd Room
Session Chair:
Philip Nyhus***

3:30-5:00 PM

3:30 pm	<u>Allison Stewart ('05)</u> The Forest Service's Quest for Power and Money and its Implications for the American Public
4:00 pm	<u>Brendan Carroll ('05)</u> The Transboundary Implications of Wolf Reintroduction and Recovery in Maine
4:30 pm	<u>Jessica Beetz ('05)</u> The Role of Private Ownership in the Conservation of Exotic Species

SESSION XVII: MATHEMATICS Honors Presentation

***Mudd 405
Session Chair:
Jan Holly***

4:00 PM

<u>Jamie Falk ('05)</u> Wedderburn Structure Theory



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Keynote Address - Dr. Sandra Steingraber
April 27, 7:30 pm Olin 1

Poster Sessions

PLEASE NOTE - Posters will be set up before 12 noon on the day assigned and taken down between 5 and 6 PM on the same day. They will be on display for one day only. Posters will be attended by the authors from 12 noon to 2:00 p.m. on Thursday or Friday, April 28 and 29.

Posters with an ODD poster number in the list below (1, 3, 5, etc.) will be set up and attended on THURSDAY, April 28, from 12 noon to 2 p.m. Posters with an EVEN poster number (2, 4, 6, etc.) will be set up and attended on FRIDAY, April 29, from 12 noon to 2 p.m.

1. **Gillian Butsch ('06), Biology**
Territoriality in Male New Zealand Fur Seals (*Arctocephalus forsteri*) at a Breeding Colony on Otago Peninsula, New Zealand
2. **Lawrence M. Dagrosa ('05), Biology**
Histological Analysis of Leukocyte Populations in Anterior Kidneys of Smallmouth Bass (*Micropterus dolomieu*) and White Suckers (*Catostomus commersoni*)
3. **Cory Ernst ('05), Biology**
Identification of IL-4-Producing Cells in Mutant fsn/fsn Mice by Immunohistochemistry and Confocal Microscopy
4. **Rharaka Gilbert ('05), Biology**
Dominance vs. Diversity: Kin Recognition and Female Mate Choice in Zebrafish, *Danio rerio*
5. **Rharaka R. Gilbert ('05), John E. Mahoney ('05) and Noah J. Hoffman ('05), Biology**

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The Yellow Bandit: the Identification and Characterization of Coldwater Disease Pathogen

6. **Justin A. Guay, Biology**
Resistance of Soil Bacillus from Different Maine Locations to Mercury and Antibiotics
7. **Noah J. Hoffman ('05) and Dr. Samantha M. Wisely, Biology**
Development of Microsatellite Markers in *Mephitis macroura*
8. **Laura Hudecek ('05) and Patrick Ely ('05), Biology**
Effects of Direct and Indirect Cues of Predation Risk on Small Rodent Foraging Behavior
9. **Carolyn P. Hunt ('05), Biology**
Foraging Behavior of the Green Anole Lizard (*Anolis carolinensis*) after Bursts of Exercise
10. **John Mahoney ('05), Noah Hoffman ('05) and Rharaka Gilbert ('05), Biology**
The Yellow Bandit: Identification and Characterization of Coldwater Disease Pathogen.
11. **Julia Morrison ('05), Biology**
Conditioned Taste Aversion in Mice (*Mus musculus*)
12. **Erin Parry ('06) and Matt Meredith ('06), Biology**
Characterization of Mercury and Antibiotic Resistance Determinants in Salmonid Gastrointestinal Bacteria
13. **Jillian E. Parker ('05) and J. Michael Conlon, Biology**
Analysis of Antimicrobial Peptides in Amphibian Skin Secretions
14. **Kathryn A. Slemp ('05), Biology**
Physiological and Behavioral Effects of Caffeine Ingestion and Voluntary Wheel Running in Female Mice (*Mus musculus*)
15. **Natalie A. Wayne ('06), Biology**
Sequencing of a cDNA Encoding a Full Length Version of the PKABA1 Interacting Protein TaWD40 and Preparation for Protein Expression
16. **John Cole ('05) and Eric Bergh ('07), Chemistry**
The Synthesis of Biomimetic Complexes for Tungsten and Molybdenum Enzymes
17. **Michael Feldman ('05), Chemistry**
Synthesis and Characterization of Oxygen-Bridged Multi-Oxalix[4]arenes
18. **Trevor C. Hanly ('07), Chemistry**
Stereospecificity of the DNA Cross-linking Reaction of Diepoxybutane.
19. **Kevin J. Selby ('05), Chemistry**
Synthesis and Characterization of Pyridine-based Bicyclooxalixarenes
20. **Kevin W. Fritze ('07), Environmental Studies**
Transportation in Maine
21. **Caitlin Chamberlin ('05), Environmental Studies**
The Relationship Between Watershed Boundaries and Elevation in Maine
22. **Kevin W. Fritze ('07), Environmental Studies**
Viewshed Analysis of the Lands of the Belgrade Regional Conservation Alliance
23. **Caitlin E. Chamberlin ('05), Environmental Studies**
Hazard Areas Associated with Major Volcanoes in the Cascade Mountain Range
24. **Sarah Dunham ('05), Environmental Studies**

Atlas of Maine: Bedrock

25. **Rich Crowley ('05), Environmental Studies**
Fish Density in Maine Lakes
26. **Sarah Dunham ('05), Environmental Studies**
Fire Hazard in Coconino County, Arizona
27. **Rich Crowley ('05), Environmental Studies**
Gulf of Mexico's Offshore Oil Platform Wind Potential
28. **Carolyn P. Hunt ('05), Environmental Studies**
The Colby College Greenhouse Gas Emissions Audit
29. **Alexandra Jospe ('06), Environmental Studies**
Estimated Number and Location of Future Moose-vehicle Collisions (MVC) in Maine.
30. **Steve Kasperski ('05), Environmental Studies**
Educational Assessment of Maine's 11th Graders
31. **Alexandra Jospe ('06), Environmental Studies**
Atlas of Maine: Moose-vehicle collisions (MVC) in the State of Maine from 1992-2004.
32. **Stephen A. Kasperski ('05), Environmental Studies**
A Spatial Comparison of Short and Long Term Migration Trends in China
33. **Theodore F. McDermott ('06), Environmental Studies**
Analysis of Future Construction Possibilities on the Colby College Campus
34. **Rob Mehlich ('05), Environmental Studies**
Atlas of Maine: USGS Topographic Maps over a Hillshaded Digital Elevation Model
35. **Theodore F. McDermott ('06), Environmental Studies**
2004 Distribution of Brood Trout Stockings For The State of Maine
36. **Rob Mehlich ('05), Environmental Studies**
A Preliminary Habitat Suitability Analysis for the Restoration of South China Tigers in the Hupingshan Reserve, China
37. **Sophie Newbury ('08), Environmental Studies**
An Analysis of the Maine Coast: Potential Wind Farm Locations?
38. **Conor Semler ('05), Environmental Studies**
Money and Education: How Economic Distribution Corresponds to Academic Success
39. **Sophia S. Newbury ('08), Environmental Studies**
Atlas of Maine: A Map of Impoundments and Their Primary Purpose on Maine Rivers
40. **Conor Semler ('05), Environmental Studies**
Atlas of Maine - Urban Sprawl: Population Migration from 1990-2003
41. **Wendy Sicard ('05), Environmental Studies**
Maine Atlas: Wildlife Habitat
42. **William G. Stohner ('05), Environmental Studies**
Affordable Housing in Kennebec County
43. **Wendy A. Sicard ('05), Environmental Studies**
A GIS Suitability Analysis of Wolf Habitat in Maine

44. **William G. Stohner ('05), Environmental Studies**
Changes in Maine's Unemployment Rate
45. **Emily Wilbert ('07), Environmental Studies**
Average Annual Precipitation in Maine
46. **Gabrielle Adams ('06) and Noah Balazs ('06), Geology**
Nitrate and Phosphate Levels in Soil and Water and How They Reflect Previous Crop Growth on a Farm
47. **Emily Wilbert ('07), Environmental Studies**
Detailed Map and Recreational Suitability Assessment of the Colby Trail System
48. **Sarah Dunham ('05), Geology**
Rock Detective's Approach to Kaolin for Grades K-12
49. **Sam Gray ('05), Geology**
Search for the Elusive Permian-Triassic Boundary Laminates of the Karoo Basin, South Africa
50. **Newton W. Krumdieck ('07), Geology**
Three-Dimensional Graphitized Plant Fossils from the First Upright Plants on Earth: Trout Valley Formation, North-Central Maine
51. **Mallory C. Young ('05), Geology**
Geological and Historical Investigation of the Belgrade Lakes Watershed
52. **Seth Pierrepont ('05), Mathematics**
Chaos and Fractals: A Taste of Nonlinear Dynamics
53. **Gabe Adams ('06), Meridith Major-Blascovich ('07) and Steen Sehnert ('06), Psychology**
Group Deliberation Effects on the Anchoring and Adjustment Heuristic
54. **Annette Caswell ('05), Psychology**
Gender Differences in Salivary Estradiol and Testosterone Response to Infant Stimuli
55. **Nicholas Larsen ('05) and Brittainy Heitzman ('05), Psychology**
Terror Management Theory: Does Sensation Seeking Buffer Against the Effects of Mortality Salience?
56. **Elli Jenkins ('06), Biology**
The Preferential Foraging and Habitat Selection Sites of Black-capped Chickadees in the Colby College Perkins Arboretum
57. **Kelly Wheaton ('05), Psychology**
Sex Differences in Environment-Dependent Ethanol Tolerance in C57BL/6 Mice
58. **Lena K. Bachmair ('07), East-Asian Studies**
The Colville Collection of Chinese Tomb Art

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Associated Sessions

FRENCH
French Senior Presentations

Session Chair: Jonathan Weiss

Alexandru Mocanu	Rencontres de mon regard
Neha Sud	Jaya, ou les malheurs de la vertu
Catherine Sear	La Fille au parapluie rouge
Ivan Mihajlov	Le Gardien de ma jeunesse
Katie Markowski	L'Expérience des Américains noirs en France pendant > l'entre-deux-guerres
Scarlett Slenker	Ma France imaginée

Presentations in French

Brittainy Heitzman	L'Homosexualité en France
Bill Ford	Le 6 juin
Shareen Abbasy	Une Fontaine d'idées
Jocelyn LeBlanc	Une Série de lettres : études des relations entre > les Français et les Francophones d'Amérique du Nord.
Kyle Foley	Un Dimanche soir
Jennifer Leighton	Les relations franco-malgaches

Ann MacDonald	Confort, contentement et culture : une exploration photographique de l'espace en France
Hilary Klug	Le Québec: La Communauté imaginaire
Emily Honig	Fluctuat nec mergitur
Eliza Huleatt	Avenue Félix Faure

Wednesday, March 2

BIOLOGY
Comparative
Vertebrate Anatomy
 11:00 AM

Olin 234
Session Chair: Cathy Bevier

Jaehee Yun ('08), Jenny Zuar ('08) and Josh Lord ('08)
 Innovations of the Integument: Functions of Mammalian Hair
Nikki Wong ('07), Emily Lyczkowski ('08) and Rose Becker ('08)
 Jaw Evolution and Cranial Kinesis
Tom Reznick ('07) and Alex Shafer ('07)
 Vertebrate Pectoral Girdles

Friday, March 11

CHEMISTRY
Senior Presentations
 3:00 PM

Keyes 105
Session Chair: Julie Millard

Mike Sirois ('05)	Superoxide and Hydrogen Peroxide Reactivity in Natural Waters
Kathy Rittner ('05)	Potential DNA Cross-Linking of Epichlorohydrin
Michael Feldman ('05)	Synthesis and Characterization of Di- and Tri-Oxacalix[4]arenes
Clara Koh ('05)	Binding Affinities of hMutSalpα for 6-thioguanine and 6-methylthioguanine in DNA: A Basis for Lesion Toxicity

Tuesday, March 15

PHYSICS AND
ASTRONOMY
Senior Presentations
 3:00 PM

Mudd 311
Session Chair: Charles Conover

Joey Farrell ('05)	Philosophical Interpretation of Special Relativity
Stanislav Presolski ('05)	Chirped Adiabatic Passage

Tuesday, March 29

**PHYSICS AND
ASTRONOMY
Senior Presentations
3:00 PM**

**Mudd 311
Session Chair: Charles Conover**

**Jamie Falk
('05)**

Modes of Gravitational Radiation

**Ryan Boccuzzi
('05)**

Design of a Permanent Magnet Bias Field for the Plasmoid Thruster Experiment

Friday, April 1

**CHEMISTRY
Senior Presentations
3:00 PM**

**Keyes 105
Session Chair: Julie Millard**

**Cary Gittleman
('05)**

Biphenylene-Based Aromatic Macrocycles and Cage Compounds

Rodney Yeoh

Metal Ions in Blood Clotting

**Devon Hutton
('05)**

The Pinacol Rearrangement

**Cary Fridrich
('05)**

Synthesis and Derivatization of Functionalized Oxacalixarenes

Tuesday, April 5

**PHYSICS AND
ASTRONOMY
Senior Presentations
3:00 PM**

**Mudd 311
Session Chair: Charles Conover**

**Conor Semler
('05)**

Plasma Fusion Reactors

**Lubos Hudec
('05)**

Ladder Climbing and Control

Wednesday, April 6

**BIOLOGY
Comparative
Vertebrate Anatomy
11:00 AM**

**Olin 234
Session Chair: Cathy Bevier**

Christine Avena ('08), Jenn Mizen ('08) and Jenn Moody ('07)

Adaptations and Flight: A Presentation on Avian Muscles and Locomotion

Leah Hagamen ('05), Nina Harrold ('05) and Sophie Smith ('08)

Specialization of the Digestive Tract: The Cow Stomach

Caroline O'Connor ('06), Emily Devlin ('07) and Sarah Burstein ('07)

The Large Intestine in Mammals

Thursday, April 7

GOVERNMENT
Democratization in
Latin America
 1:00 PM

Lovejoy 344
Session Chair: Ariel Armony

Ashley Mihos
 ('05)

Gender Discrimination in Mexico and the Question of Democracy

Doug Summa
 ('05)

Pawn or Empowerment: Women and Women's Rights in Peru
 vis-à-vis Sendero Luminoso

Friday, April 8

CHEMISTRY
Senior Presentations
 3:00 PM

Keyes 105
Session Chair: Julie Millard

Tim Newhouse
 ('05)

Photochemical Generation of Chloro,beta-acetoxycarbene

Amy Campfield
 ('05)

Synthesis of Gamma Meta-Para Bridged Cyclophaine

Szymon
Mikulski ('05)

Dirhodium(II,II)carboxylate Compounds Bind to Interstrand
 Cross-link Duplex DNA

Kenneth Pitter
 ('05)

TBA

Tuesday, April 12

PHYSICS AND
ASTRONOMY
Senior Presentations
 3:00 PM

Mudd 311
Session Chair: Charles Conover

Tsering Wangdi
 ('05)

Laser Frequency Locking

Lucas Thatcher
 ('05)

Electromagnetic Modes in Axial Gauge

Thursday, April 14

GOVERNMENT
Democratization in
Latin America
 1:00 PM

Lovejoy 344
Session Chair: Ariel Armony

Jonah Waxman ('05)	A Democracy in Name Only: Drugs, Corruption, and Human Rights Violations in Colombia
Adrienne Mohn ('05)	Indigenous Peoples of Guatemala and the Question of Democracy: A Post-War Analysis

Friday, April 15

CHEMISTRY
Senior Presentations
 3:00 PM

Keyes 105
Session Chair: Julie Millard

Stanislav Presolski ('05)	LFP Studies of Chlorocarbenes
Melissa Mullen ('05)	Metal Ion Binding to 6-Thioguanine
Ivan Mihajlov ('05)	Nutrient Dynamics of Belgrade Lakes Watershed
Katie Sigalow ('05)	An Examination of Alternating Hydroxy and Pyridine Groups in Oxacalixarenes

Tuesday, April 19

PHYSICS AND ASTRONOMY
Senior Presentations
 3:00 PM

Mudd 311
Session Chair: Charles Conover

Melissa Yosua ('05)	Fine-Structure Spectroscopy of Sodium Rydberg p-states
Katie Lynch ('05)	Ultra-High-Energy Cosmic Rays
Zack Hauptman ('05)	Reflectance Spectroscopy

MATHEMATICS
Senior Presentation
 4:00 PM

Mudd 405
Session Chair: Jan Holly

Seth Pierrepont ('05)	Chaos and Fractals: A Taste of Nonlinear Dynamics
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Wednesday, April 20

RELIGIOUS STUDIES
Senior Scholars Presentation
 4:00 PM

Lovejoy 215
Session Chair: Nikky Singh

Mark Chapman ('05)	Chinese Muslims and Global Islam
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Thursday, April 21

GOVERNMENT **Democratization in** **Latin America** 1:00 PM

Lovejoy 344
Session Chair: Ariel Armony

Conor Gleason ('05)	Multi-National Indigenous Coalitions: An Analysis of Overall Effectiveness in the Quest for Sovereignty
Sunshine Timothy ('05)	Human Rights and Democratization: A Comparative Study on Chile and Burma

BIOLOGY **The Cell Cycle and** **Cancer** 7:00 PM

Olin 234
Session Chair: Paul Greenwood

Lydia Durant ('05)	Fertility Drugs and Ovarian Cancer: What Are the Risk Factors Involved?
Maureen Sherry ('05)	Telomere Maintenance in Cancer: Regulation and Implications for Prognosis and Treatment
Carolyn Pollard ('05)	Cancer Risk Associated with Hormone Replacement Therapy (HRT) Use in Post-menopausal Women
Meghan Barringer ('05)	What You Really Got Out of Your Spring Break: UV Radiation and Skin Cancer
Erin Rockney ('05)	Colon Cancer: Pathogenesis, Diagnosis, and Treatment
Kate Crocker ('05)	New Oral Chemotherapies
John Mahoney ('05)	How Can You Trust Air That You Can See?
Matthew Lynes ('05)	Sweet, Sweet Cancer: Food Additives and Carcinogenesis

Friday, April 22

CHEMISTRY **Senior Presentations** 3:00 PM

Keyes 105
Session Chair: Julie Millard

Vassy Zheleva ('05)	Copper(I) Arene Complexes
Michael Walsh ('05)	Superoxide: the Quest for Answers
Kevin Selby ('05)	Synthesis of Bicyclic calixarenes
Zachary Sager ('05)	(Don't) Pump up the Heat

Monday, April 25

BIOLOGY
Molecular Ecology
 10:00 AM

Olin 335
Session Chair: Stacey Lance

Matt Tozer ('05) and Laura Hudecek ('05)
 MHC and Tests of Adaptive Evolution

Monday, April 25

BIOLOGY
Comparative
Vertebrate Anatomy
 11:00 AM

Olin 234
Session Chair: Cathy Bevier

Amanda McGarry ('07) and John Walden ('07)
 Electroreception in the Duck-billed Platypus
Sharon McMonagle ('06), Julie Hike ('07) and Alex White ('07)
 Innovations of the Vertebrate Eye
Ryan O'Flanagan ('06), Kristin Putnam ('05) and Juliana Green ('05)
 Pheromone Functions in Vertebrates

MATHEMATICS
Honors Presentation
 4:00 PM

Mudd 405
Session Chair: Jan Holly

Torrey Kulow ('05) MathEd to the Max: Delving into Mathematics Curricula

PHILOSOPHY
Honors Presentation
 4:00 PM

Lovejoy 215
Session Chair: Cheshire Calhoun

Alex Tellis An Inquiry into the Convergence of Religious Imperatives and Secular Ethics
Josh Kahn ('05) Separating the Good from the Great: Toward an Objective Criterion for Value in Music
Chris Surprenant ('05) Cultivating a Good Will: Moral Progress and the Kantian State
Megan Burd ('05) Mysticizing Philosophy

ENGLISH
Senior Scholars
Presentation
 8:00 PM

Mary Low Coffeehouse
Session Chair: Jenny Boylan

Jenny Boylan, Courtland Fowler ('05) and Stephen Whelpley ('05)
 A Whelp & Company

Wednesday, April 27

BIOLOGY
Molecular Ecology
 10:00 AM

Olin 335
Session Chair: Stacey Lance

Caroline Polgar ('06), Dave Civitello ('06), Steve Markesich ('05) and Nick Larsen ('05)
 Role of MHC in Fitness and Reproductive Biology

BIOLOGY
Bacteriology
 1:00 PM

Arey 307
Session Chair: Frank Fekete

Peter Arlein ('07) and Hande Barutcuoglu ('05)
 Community Acquired Methicillin Resistant *Staphylococcus aureus*
Casey Dunton ('06) and Stephanie Freese ('07)
 Leptospirosis
Jessica C. Lefoley ('06) and Jonathan W. Ashcroft ('06)
 Marburg Hemorrhagic Fever
Becky Greslick ('06) and Brian Rodriguez ('06)
 Methicillin-Resistant *Staphylococcus aureus* (MRSA)
Becky Mandeville ('06) and Zack Goldman ('06)
 Pathogenicity of *Yersinia pestis*, the Causal Agent of Bubonic Plague
Kara Lanahan ('05) and Richard Raymond ('05)
 Periodontitis: A Risk Factor for Systemic Disease?
Annette Caswell ('05) and Cara Pollard ('05)
 Tampon-Associated Toxic Shock Syndrome (TSS): Is it on the Rise?
Michael Misencik ('05) and Rob Mehlich ('05)
 The Black Death: The Plague Past and Present
Andrew Herstein ('07) and Callie McDowell ('06)
 The Interaction between Cystic Fibrosis and Cholera

PHYSICS AND
ASTRONOMY
Senior Presentations
 3:00 PM

Mudd 311
Session Chair: Charles Conover

Magha Kapoor ('05) Transmission Spectroscopy
Chilann Chan ('05) Fast Current Switch for a Magnetic Field

MATHEMATICS
Honors Presentation
 4:00 PM

Mudd 405
Session Chair: Jan Holly

Chris van Wagenen ('05) Higher Order Reciprocity Laws Via Gauss and Jacobi Sums

Wednesday, April 27

BIOLOGY
Bacteriology

Arey 307
Session Chair: Frank Fekete

1:00 PM

Sarah Becker ('06) and Andrew Johnson ('06)

An Overview of Bioremediation

Jessie Kaplan ('07) and James Bennett ('06)

Avian Influenza

Riley O. Doyle ('07)

Industrial Bacterial Fermentation of Pharmaceutically Active Products

Jocelyn LeBlanc ('05) and Jessica Taylor ('07)

Lyme Disease: An Emerging Threat to the Northeast

David Amadu ('07) and Kenza Sayegrih ('07)

Malaria: Epidemiology, Symptoms, Prevention, and Treatment

Dan Cummins ('05) and Maggie Allen ('05)Methicillin Resistant *Staphylococcus aureus*: A 'Super Microbe' Awaits Your Next Hospital Visit.**Nicole Conrad ('05), Erin Rockney ('05), Emily Goodyear ('05) and Meg Musser ('05)**Petting Zoos Gone Wrong: *Escherichia coli* Outbreak**Kate Crocker ('05) and Marina Stakes ('06)**Silent But Dangerous: *Chlamydia trichomatis***Maggie Johnson ('06) and Christian Crannell ('08)**

The History and Current Outbreak of the Marburg Virus

David Civitello ('06) and Emily Mosites ('06)

The Revival of Phage

Laura Keeler ('07) and Marguerite Davis ('07)

What's the Big Baloo about Biofilms?

**COMPUTER SCIENCE
Honors Presentations**

4:00 PM

**Mudd 405
Session Chair: Dale Skrien****Noah Smith ('05)**

Learning Classifier Systems and Evolutionary Robotics

Jesse Wrenn ('05)

A Complex Systems Approach to Researching Behavioral Trends

Friday, April 29**BIOLOGY
Molecular Ecology**

10:00 AM

**Olin 335
Session Chair: Stacey Lance****Steve Markesich ('05) and Dave Civitello ('06)**

Molecular Ecology of Wolves and Coyotes.

**GOVERNMENT
Democratization in
Latin America**

1:00 PM

**Lovejoy 344
Session Chair: Ariel Armony****Graham Hennessey ('05)**

The Effects of Neoliberal Policy on Economic Inequality in Brazil

Mike Miller ('05)

Plurinationalism and Democracy? Bilingual Education and Symbolism at Play in Bolivia

COMPUTER SCIENCE
Honors Presentations
 4:00 PM

Mudd 405
Session Chair: Dale Skrien

Computer Science Honors Presentations	
Chris Ries ('05)	Automated Identification of Malicious Code Variants
Russ Spitler ('05)	Eclipse Java Security Scanner - JSS

BIOLOGY
The Cell Cycle and Cancer
 7:00 PM

Olin 234
Session Chair: Paul Greenwood

Megan Daley ('05)	Cervical Cancer
Noah Hoffman ('05)	Prostate Cancer: The TGF- β Pathway and Treatment
Lily Maltz ('05)	Pancreatic Cancer: The Silent Killer
Brian Rodriguez ('06)	Adult and Childhood Leukemia: A Developmental and Fundamental Comparison of AML and ALL
Christina Pluta ('05)	Breast Cancer: Men Can Get It Too!
Amy Campfield ('05)	Neonatal Neuroblastomas: Causes, Detection, and Treatment of Cancer in Newborns

Friday, April 29

CHEMISTRY
Senior Presentations
 3:00 PM

Keyes 105
Session Chair: Julie Millard

Galia Debelouchina ('05)	Guest-Host Chemistry of Calix[6]arenes
Yan Kung ('05)	Towards the Production of a Mutant S-RNase that Inhibits Self-incompatibility
John Cole ('05)	A Biomimetic Tungsten Complex
Jonathan Lees ('05)	Predicting Guest Host Binding

MATHEMATICS
Honors Presentation
 4:00 PM

Mudd 405
Session Chair: Jan Holly

Jamie Falk ('05)	Wedderburn Structure Theory
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Monday, May 2

ENVIRONMENTAL

**STUDIES
Environment and
Society**

10:00 AM

**Session Chair: Russ Cole, David
Firmage, and Liliana Andonova**

Hurd Room

**Anna Birnberg ('08), Beth Darling ('08) and Jake Pinkston ('08),
Environmental Studies**

Religion and the Environmental Sustainability of Countries

Smith Room

**Courtney Larson ('08), Jeff Carroll ('08), Sam Boss ('08) and Kristina
Shiroka ('08), Environmental Studies**

Are Pesticides Needed to Produce Viable Yields on Commercial Farms?

Whitney Room

**Jamie O'Connell, Nicole Terrillion ('08) and Sarah Romeo ('08),
Environmental Studies**

What Factors are Most Influential in Creating an Effective Recycling Program?

**BIOLOGY
Molecular Ecology**

10:00 AM

Olin 335

Session Chair: Stacey Lance

Ilana Saxe ('05) and Karli Gasteazoro ('07)

Evolution of Brood Parasitism: What Molecular Ecology Has Taught Us.

**RUSSIAN
Foreign Language
Presentations**

1:00 PM

Lovejoy 450

Session Chair: Julie de Sherbinin

Presentations in Russian

**Anna Khatutsky
('07)**

◆The Role of the Writer and Literary Texts in Mikhail
Bulgakov's The Master and Margarita◆

**Jennie
MacPherson
('05)**

◆Destruction and Rebirth: Water Symbolism in Mikhail
Bulgakov's The Master and Margarita◆

**MATHEMATICS
Honors Presentation**

4:00 PM

Mudd 405

Session Chair: Jan Holly

**Brandy Lipton
('05)**

Spectra, Sunspots, and Seasonal Effects: An Extension of
Fourier Analysis

**GERMAN
German Language
Senior Presentations**

7:00 PM

Lovejoy 450

Session Chair: Ursula Reidel-Schrewe

Presentations in German

**Justin Dubois
('05)**

Der wechselnde Begriff von Nation und Heimat in Deutschland.
(The Changing Concept of Nation State and Homeland in
Germany)

**Katie Ryckman
('06)**

Die schwarze Heimat. (Blacks in Germany)

**Lubos Hudec
('05)**

Die Sudetendeutschen. (The Sudeten Germans)

**Maria Sanders
('05)**

Die Rolle der Frau in Edgar Reitz' Heimat. (The Role of Women
in Edgar Reitz's Film Series Heimat)

Heimat - unter dem Aspekt von Sprache und Geschlecht. (The

Matt Ruby ('05) Role of Language and Gender in the Construction of)

Kathleen Ghelli ('05) Hinweise auf die nationalsozialistische Ideologie und Politik in Edgar Reitz' Heimat. (References to Nazi Ideology and Politics in Edgar Reitz's Film Series Heimat)

Tuesday, May 3

SCIENCE, TECHNOLOGY, AND SOCIETY STS Senior Research Presentations

Keyes 103
Session Chair: Jim Fleming

- 11:30 AM Zachary S. Sager ('05), Science, Technology, and Society**
The 10th Mountain Division and Outdoor Recreation in America
- 11:00 AM Caroline E. V. Collins ('05), Science, Technology, and Society**
The Dispute between Lewis Mumford and Frank Lloyd Wright Over Urban Planning
- 12:30 PM Chase D. Cohen ('05) and Corwith Cramer III ('05), Science, Technology, and Society**
Throwing things: Construction and Demonstration of a Roman Onager (outside at a site to be announced, weather permitting).

BIOCHEMISTRY Biochemistry of the Cell

Olin Arcade
Session Chair: Paul Greenwood

12:00 noon

- Shawn Sato ('05) and Kate Durda ('05)**
Fabry's Disease
- Leah Weitz ('06) and Kathy Rittner ('05)**
Fanconi-Bickel Syndrome
- Katie Sigalow ('05), Dana Gwinn ('05) and Amy Campfield ('05)**
Fish Odor Syndrome
- Zack Goldman ('06) and Becky Mandeville ('06)**
Gaucher's Disease
- Matt Meredith ('06)**
Glycogen Storage Disease VI
- Kevin Selby ('05) and Vassy Zheleva ('05)**
Lesch-Nyhan Disease
- Mike Sirois ('05) and Dan Fowler ('06)**
Maple Syrup Urine Disease
- Romeo Raugei ('06) and Adam Osterle**
Neimann-Pick Disease
- Erin Parry ('06) and Lindsey Boyle ('06)**
Phenylketonuria
- Natalie Wayne ('06) and Maureen Sherry ('05)**
Pompe's Disease
- John Fallon ('05) and Meg Musser ('05)**
Tangier Disease
- Rodney Yeoh ('05) and Rami Zahran ('06)**
Tay Sachs Disease

PHYSICS AND

ASTRONOMY
Senior Presentations

Mudd 311
Session Chair: Charles Conover

3:00 PM

Eric Brockmeyer ('06)

Delta-Scuti Variability in the Pre-Main Sequence Stars SVCep and RRTau

Chris Farrell ('05)

M-Star Variability

MATHEMATICS
Senior Presentation

Mudd 405
Session Chair: Jan Holly

4:00 PM

Galia Debelouchina ('05)

Picard-Vessiot Extensions

RELIGIOUS STUDIES
Honors Presentation

Lovejoy 102
Session Chair: Nikky Singh

4:00 PM

Christopher Rodney Yeoh ('05)

Opening the Windows of the Church to the World: The Creation of Nostra Aetate and its Impact on Christian-Jewish Relationship

Clara Koh ('05)

The Rhetorics of Violence in Joshua: Foucauldian Power, Israelite Identity, and the Ethics of Interpretation

Wednesday, May 4

ENVIRONMENTAL STUDIES
Environment and Society

Session Chair: Russ Cole, David Firmage, and Liliana Andonova

10:00 AM

Hurd Room

Samantha Rose ('08), Jamie Poster ('08), Liz Clark ('08) and Charlie Coit ('08), Environmental Studies

Economic Development and Waste

Smith Room

Beth Hirschhorn ('07), Rebecca Travis ('07), Jackie Rolleri ('06) and Suzanne Moreau ('08), Environmental Studies

Are Rural Schools More or Less Likely to Include Environmental Education in Their Curriculum?

Whitney Room

Heather Hansman ('05), Leora Feldstein ('08), Reed Sibley ('05) and Sophie Newbury ('08), Environmental Studies

Do Famous Recreational Rivers Get More Consideration and Protection than Other Rivers?

BIOLOGY
Molecular Ecology

Olin 335
Session Chair: Stacey Lance

10:00 AM

Lydia Durant ('05) and Isabelle Reining ('05)

Evolution of Avian Migration: Are Migratory Birds Tropical or Temperate Species?

BIOLOGY
Evolution
1:00 PM**Olin 223**
Session Chair: Judy Stone

Genevieve Dubuque ('07), Lily Maltz ('05), Luke L'Heureux ('06), Emily Devlin ('07), Nathan Mylrea ('05), Daniel Schupack ('07), Sara Hamada ('05), David Cheng ('06), Anna Czechowski ('07) and Caroline O'Connor ('06)

DNA Fingerprinting by AFLP Reveals Population Genetic Structure of a Federally Threatened Orchid, *Isotria medeoloides***RUSSIAN**
Foreign Language
Presentations
1:00 PM**Lovejoy 450**
Session Chair: Julie de SherbininVasilena
Zheleva ('05)
Rachel Hatch
('05)
Conor Semler
('05)
Abe Summers
('05)**Presentations in Russian**

◆You're head will be cut off!◆The Devil, the Intellect and the Heart in Bulgakov's The Master and Margarita◆

◆Light and Darkness in the Philosophical Scheme of Mikhail Bulgakov's Novel The Master and Margarita◆

◆The Bird as a Symbol of Freedom in Mikhail Bulgakov's The Master and Margarita◆

◆Sight and Vision in Mikhail Bulgakov's The Master and Margarita◆

ENVIRONMENTAL
STUDIES
Climate Change
Politics
2:30 PM**Olin 234**
Session Chair: Liliana Andonova

Nick Von Mertens ('05)

Elizabeth Rose ('07), Charlie Reed ('06), Jayadev Vadakkanmarveettil ('06), Whitney Jones ('05), Sarah Forsyth ('08), Kevin Fritze ('07), Jess Hulbert ('06), Jamie Goldring ('08), Heather Burke ('05) and Emily Sinnott ('08)

The Future of Climate Cooperation

COMPUTER SCIENCES
CS Fest
3:00 PM**Mudd 415**
Session Chair: Dale SkrienCharles Fizer
('05)**Demos of Independent Study Projects**

A Knowledge Editor for Designing Pattern-Driven Intelligent Systems

Andreea Olea
('07) and Jesse
Wren ('05)

Can Neural Networks Learn Cross Products?

Christopher
Ries ('05)

Automated Identification of Malicious Code Variants

Russell Spitler
('05)

Java Security Scanner - JSS

Jared
Goldsmith ('05)

Prediction of Ocean Swells

Jesse Wrenn

A Complex Systems Approach to Researching Behavioral

('05)	Trends
Nel Dutt ('05)	An Integrated Approach to Intelligent Team Behavior Using AIBO Robots and the Soar Cognitive Architecture
Noah Smith ('05)	Evolving Communication to Aid Cooperation in a Multi-Agent System

COMPUTER SCIENCE
CS Fest
3:30 PM

Mudd 4th Floor
Session Chair: Clare Congdon

Posters of Independent Study Projects	
Jesse Wrenn ('05)	A Complex Systems Approach to Researching Behavioral Trends
Russell Spitler ('05)	Java Security Scanner - JSS
Noah Smith ('05)	Evolving Communication to Aid Cooperation in a Multi-Agent System
Charles Fizer ('05)	A Knowledge Editor for Designing Pattern-Driven Intelligent Systems
Christopher Ries ('05)	Automated Identification of Malicious Code Variants

COMPUTER SCIENCE
CS Fest
3:30 PM

Mudd 4th Floor
Session Chair: Clare Congdon

Matt DeLoria ('06), Charles Fizer ('05) and Nick Stielau ('06)
 A Java application for composing music using MIDI
Noah Smith ('05), Thomas Cook ('07), Andreea Olea ('07) and Jared Goldsmith ('05)
 Be the Glove

Thursday, May 5

RUSSIAN
Foreign Language
Presentations
12:00 Noon

Lovejot 246
Session Chair: Julie de Sherbinin

Presentations in Russian	
Rachel Hatch ('05)	◆Light and Darkness in the Philosophical Scheme of Mikhail Bulgakov's Novel The Master and Margarita◆
Conor Semler ('05)	◆The Bird as a Symbol of Freedom in Mikhail Bulgakov's The Master and Margarita◆

BIOLOGY
Evolution
1:00 PM

Olin 223
Session Chair: Judy Stone

Natalie Wayne ('06), Tenzin Tsewang ('07), Matthew Tozer ('05), John Walden ('07) and Lindsay Teittinen ('06)

Geoffrey Buckle ('07), Gregory Engel ('07), Jonathan Ashcroft ('06), Lawrence Dagrosa ('05), Matthew Lynes ('05), Megan Daley ('05), Patrick Lizotte ('06), Elizabeth Hirschhorn ('07), Christopher Neil ('07) and Emily Pugach ('07)
 A Second Generation Common-garden Experiment: Are Maternal Effects

Responsible for Apparent Genetic Differences between the Widespread *Mimulus ringens* var *ringens* and the Rare Variety *colpophilus*?

PSYCHOLOGY
Psychology
Department Poster
Session
4:00 PM

Robins Room, Roberts
Session Chair: Diane Winn

Michael Civitello ('05)	Sleep Deprivation in the Military
Brittany Heitzman ('05)	Men in America: Gender Socialization and its Negative Consequences
Emily Day ('05)	Social Influence: Heuristics and Techniques that Increase Compliance
Alana Willhite ('05)	Children in Foster Care
Jamie Snyder-Fair ('05)	Etiology and Treatment of Primary Insomnia: A Review
Annette Caswell ('05)	Gender Differences in Salivary Hormone Response to Infant-Related Stimuli
Jennifer Abramson ('05)	Synesthesia: Phenomenology, Brain Mechanisms, and Theories
Kelly Klemarczyk ('05)	Homeless & Schizophrenic: A Review of Treatment Strategies and Challenges
Kelly Wheaton ('05)	Sex Differences in Environment-Dependent Ethanol Tolerance in C57BL/6 Mice
Matthew Ruby ('05)	Semen Exposure and Depression in MSM: Revisiting Burch & Gallup (2002)
Sean Baron ('05)	How Robust is the Illusory Flash Effect? - An ERP Study
Nora Gouge ('05)	Fuzzy Logic and Emotions
Nicholas Larsen ('05)	Artificial Intelligence and Human-like Cognitive Properties

BIOLOGY
The Cell Cycle and
Cancer
7:00 PM

Olin 234
Session Chair: Paul Greenwood

Nicole Conrad ('05)	Cancer Vaccines: Possibilities for Active Immunotherapy Against Cancer
Kathryn Austgen ('05)	Immune System Evasion by Cancer Cells
Patrick Ely ('05)	The Medical and Political Impacts of Early Detection in Breast Cancer and Prostate Cancer
Kate Crocker ('05)	New Oral Chemotherapies
Lawrence Dagrosa ('05)	Dendritic Cells and Immunotherapy of Cancer: So Hot Right Now
Danielle Martin ('05)	Cannabinoids and Cancer: The Therapeutic Value of Cannabinoid Receptors
Dana Gwinn ('05)	Cancer Gene Therapy: Types, Strategies, and Trials

**ENVIRONMENTAL
STUDIES****Environment and
Society**

7:00 PM

**Session Chair: Russ Cole, David
Firmage, and Liliana Andonova**

Keyes 102

**Sujit Shrestha ('07), Joel Alex ('08), Jenn Corey ('06) and Emmie
Theberge ('08), Environmental Studies**Is Organic Farming More Likely to Encourage Biodiversity Than Large Scale
Farming (Agribusiness)?

Keyes 103

**Danielle Preiss ('07), Sarah Burstein ('07), Kelly Bakulski ('07) and
Kathryn Bartholomew ('07), Environmental Studies**What Factors are Responsible for Producing Cities with Effective Public
Transportation Systems?

Lovejoy 202

**Anna Barnwell ('08), Jess Harold ('08), Amie Schwartz ('08) and Eric
Hansen ('08), Environmental Studies**

Why Do Countries Adhere to International Environmental Treaties?

Friday, May 6**ENVIRONMENTAL
STUDIES****Environment and
Society**

10:00 AM

**Session Chair: Russ Cole, David
Firmage, and Liliana Andonova**

Lovejoy 201

**Zen Glasser ('07), Brett Wagenheim ('09), Kelly McErlean ('08) and
Charlotte Jobrack ('08), Environmental Studies**

Do Gasoline Prices Affect the Kind of Vehicles Purchased by Individuals?

Lovejoy 202

**Holly Battelle ('08), Heidi Donahue ('08), Jason Hayes ('08) and Morgan
Manoff ('08), Environmental Studies**Does Greater Pollution Contribute to Higher Depression Levels Across Cities or
Regions?

Miller 319

**Nicole Turgiss ('08), Julie Bero ('08), Heather Burke ('05) and Lauren
Barrett ('08), Environmental Studies**

Income and Recycling in US Cities

**BIOLOGY
Molecular Ecology**

10:00 AM

Olin 335**Session Chair: Stacey Lance****Wendy Sicard
('05)**Effects of Forestry Practices on Population Genetics of Fisher,
*Martes pennanti***Pat Ely ('05)**Phylogeography of Ermine, *Mustela erminea***AMERICAN STUDIES
American Dreams**

4:00 PM

**Given Auditorium
Session Chair: Phyllis Mannocchi****Taylor Bemis ('05), Marisa Giller ('05), Meggie Finn ('05), Lizzie Johnson
('05), Elizabeth Riley ('05) and Kim Jones ('05)**

Bowling Leagues for Elders

**Corrie Shattenkirk ('05), Carrie Greer ('05), Jeff Lederman ('05), Will
Van der Veen ('05), Melissa Plante ('05) and Rodney Yeoh ('05)**

Hate Groups in Maine

Rachel Damon ('05), Emily Weber ('05), Rachel Luskin ('05), Melisse Hinkle ('05), Karinna Russo ('05) and Gillian Nadel ('05)

Lobstering in Maine

Xavier Garcia ('05), Molly Boehmke ('05), Emma Miller ('05), Eddie Mezer ('05), Curtis Chin ('05) and Sean Murphy ('05)

Paranormal Groups in Search of Ghosts

Alex Mocanu ('05), John Fallon ('05), Asma Husain ('05), Toni-Lynn Robbins ('05), Lisa Andracke ('05) and Liam McDonnell ('05)

Wounded Maine Soldiers from the War in Iraq

Sunday, May 8

FRENCH
French Independent
Project Presentations
7:00 PM

Lovejoy 100
Session Chair: Adrianna Paliyenko

Presentations in French

Katherine Boyce ('08)	Mme de Staël
Jenna Walsh ('08)	L'art romantique : Géricault
Ethan Abensohn ('07)	La Colonisation de l'Afrique: La France et L'Algérie
Katie Markowski ('05)	Joséphine
Kristin Keefrider ('07)	La Cuisine au XIXe siècle français
Catherine Sear ('05)	L'Image de la femme noire au XIXe siècle français
Mariah Whitney ('07)	La Mode française au XIXe siècle français
Neha Sud ('05)	La Vie bohème au XIXe siècle français

Monday, May 9

FRENCH
French Independent
Project Presentations
7:00 PM

Lovejoy 100
Session Chair: Adrianna Paliyenko

Presentations in French

Eliza Huleatt ('05)	L'Hystérie au XIXe siècle français
Jeff Carroll ('08)	L'Hausmannisation
Bill Ford ('05)	L'Héritage de 1870-1871 : La Commune
Shareen Abbasy ('05)	La Prostitution au XIXe siècle français
Julia Csikesz ('07)	Portraits des femmes dans l'œuvre d'Edgar Degas et Mary Cassatt
Leslie Peterson ('07)	L'éducation au XIXe siècle français
Karina Johnson ('05)	Le Monde de l'artiste femme au XIXe siècle français

Tuesday, May 10

CREATIVE WRITING
Creative Writing
Reading
7:00 PM

Robins Room, Roberts Union
Session Chair: Debra Spark

Nora Gouge ('05), Mike King ('05), Matt Ruby ('05), Stephen Whelpley ('05), Mary Medlin ('05), Andy Orr ('05), Hannah Emery ('05), Gillian Nadel ('05) and Caitlin Dennehy ('05), Creative Writing

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Colby Undergraduate Research Symposium 2005

April 27-29, Colby College, Waterville, Maine

Abstracts - Research Symposium

2005 Program

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Research Symposium

GROUP DELIBERATION EFFECTS ON THE ANCHORING AND ADJUSTMENT HEURISTIC

Gabe Adams ('06), Meridith Major-Blascovich ('07) and Steen Sehnert ('06), Psychology

The ways in which individuals are unintentionally influenced by arbitrary numerical values in making decisions is called the 'anchoring heuristic.' We are interested in the ways in which people, once made aware that a proposed value is randomly selected, adjust for this heuristic. Group polarization refers to the effects that a group has on an individual decision. Such deliberation tends to polarize, or make more extreme, a preliminary decision. Jury decision-making, because it occurs in a group, is subject to the effects of group polarization. We examined the phenomenon of the anchoring heuristic on both individual and group levels, and due to group polarization, we hypothesized that groups would be more likely than individuals to adjust for anchoring. This heuristic was examined in the context of a personal injury trial, where participants read one of two proposed monetary awards and then made decisions about how much money to award a plaintiff. They then deliberated in a group (as a jury) and re-awarded money.

NITRATE AND PHOSPHATE LEVELS IN SOIL AND WATER AND HOW THEY REFLECT PREVIOUS CROP GROWTH ON A FARM

Gabrielle Adams ('06) and Noah Balazs ('06), Geology

The soil and water on ranches in the Salinas Valley of California were analyzed for nitrate and phosphate to assess the impact of agriculture. The ranches sampled had different crops growing, including spinach, lettuce, broccoli and fallow (mustard greens). Nitrate and phosphate concentrations were measured in the soil of ranches and in suspended sediments and water in runoff streams. Soil nitrate concentrations were lowest on ranches with fallow (4.8 ppm). Ranches with commercial crops had an average nitrate concentration of 10.1 ppm, with nitrate concentrations of 10.6, 6.9, and 4.7 ppm for spinach, broccoli and lettuce respectively. Ranches in which fertilizer or compost was applied had an average nitrate concentration of 13.1 ppm, while unfertilized ranches averaged 7.2 ppm. Phosphate concentrations of 0.7, 3.2 and 3.3 ppm were determined for fields of spinach, broccoli and lettuce, respectively. Results show that phosphate concentration is not as strong a function of crop type as nitrate. Fertilized fields had lower phosphate concentrations than unfertilized (2.7 vs. 3.3 ppm). High values of nitrate (50-500 ppm) were observed in water samples, indicating leaching from surrounding fields. Phosphate values were less concentrated and less variable in runoff, ranging from 1-4 ppm. These data indicate that the concentration of nitrate and phosphate concentrations in soils can be used to determine the amounts and type of fertilizer necessary to maximize crop growth and can be used in the development of crop rotation practices. They can also determine whether fertilizer or composting is

necessary. Higher nitrate values in runoff are due to rainfall. Low nitrate values for the fields with fallow can be attributed to nitrate banking..

THE COLVILLE COLLECTION OF CHINESE TOMB ART

Lena K. Bachmair ('07), East-Asian Studies

A collection of ancient Chinese tomb art was recently lent to The Colby College Museum of Art by Colby Collectors. The collection, called the Colville Collection, consists of funerary objects from the Neolithic Period through the twelfth century. They include pottery, ceramic figures and bronze vessels. During this past Jan Plan the four students of Art 293, Asian Art Museum Workshop taught by Ankeney Weitz, performed research on the objects in the collection. We created an online exhibition to introduce the collection and showcase the objects. We arranged them within several themes to highlight interesting aspects of particular objects, including function and method of production. Additionally, we each performed more in depth research of a specific piece of our choosing. By creating this online exhibition, we hope to educate visitors about the tomb art and burial practices of ancient China, and foster a greater understanding of Chinese culture in general. For this symposium, we hope to present our work to the audience in an accessible way. We would like to have a computer available to display the website of the online exhibit we created. One of us will give a brief introduction to the exhibit and the website. The audience would then be able to ask questions and use the computer to explore the exhibit themselves. The research that the four of us completed individually would be presented in poster form. We would each create a poster, which would be presented along with the object we studied. Following the general introduction the audience would be able to approach us individually and view our posters and objects. We would then be available to answer additional questions concerning our own specific research.

TERRITORIALITY IN MALE NEW ZEALAND FUR SEALS (*ARCTOCEPHALUS FORSTERI*) AT A BREEDING COLONY ON OTAGO PENINSULA, NEW ZEALAND

Gillian Butsch ('06), Biology

Research concerning the breeding behavior of New Zealand's most common marine mammal, the New Zealand fur seal (*Arctocephalus forsteri*) is very limited. This study was initiated to establish a detailed account of male fur seal breeding behavior by quantifying territorial aggressive behavior as the first females arrive ashore to give birth at the beginning of the breeding season. Observations were recorded for three weeks at a fur seal breeding colony on Otago Peninsula, South Island, New Zealand. The colony was divided into territories which were defended by adult males through ritualized threat displays and physical fighting, in preparation for postpartum mating with incoming females. Two hypotheses were tested: first, the largest territories have the most females, and second, the territories with the most females will have the most conflict between males, quantified by male-male interactions observed. Evidence was found to support both of these hypotheses. This research establishes a baseline for studying territoriality in male fur seals and contributes to an ongoing study of behavior patterns of male fur seals at the breeding colony at the beginning of the breeding season.

GENDER DIFFERENCES IN SALIVARY ESTRADIOL AND TESTOSTERONE RESPONSE TO INFANT STIMULI

Annette Caswell ('05), Psychology

Salivary testosterone and estradiol concentrations were measured using enzyme immunoassays to determine if men and women of childbearing age who had never had children experience changes in reproductive hormone function in response to infant stimuli. 20 men and 17 women viewed either a 20-minute observational video of infants and toddlers or a control video. Saliva samples were obtained prior to, and after viewing the videos and changes in salivary hormone concentrations were determined. A significant main effect of gender on testosterone concentration was identified across both film conditions. Males demonstrated significant increases in testosterone concentration after viewing their assigned video while females displayed significant decreases. A significant main effect of film condition was also identified across both genders. Participants in the infant-stimulus condition experienced increases in testosterone concentration, while those in the control condition showed decreases in testosterone concentration. There were no significant effects of gender or film on estradiol concentration. The decrease in testosterone in response to the infant condition may reflect the aromatization of testosterone to estradiol to increase estradiol levels in preparation for ovulation and potential reproduction. The lack of significant effects of gender or stimulus on estradiol concentration may reflect a delay in the aromatization process such that the aromatized testosterone was in an intermediate form and had not yet been converted to estradiol. The lack of significant estradiol changes may also reflect experimental error because, contrary to experimental evidence, baseline estradiol concentrations were not significantly different between men and women in this investigation.

HAZARD AREAS ASSOCIATED WITH MAJOR VOLCANOES IN THE CASCADE MOUNTAIN RANGE

Caitlin E. Chamberlin ('05), Environmental Studies

ANALYSIS OF POPULATIONS AFFECTED BY VOLCANO HAZARD AREAS IN THE CASCADE MOUNTAIN RANGE The Cascade Mountain Range in Washington State is the site of several active volcanoes that have the potential erupt which would deeply affect the lives of those who live near them. This study explores the hazard areas associated with the five largest volcanoes in the region: Mt. Baker, Glacier Peak, Mt. Rainier, Mt. Adams and Mt. St. Helens. It was determined which geographic regions would be affected by tephra, pyroclastic blasts and lahar flows and the associated populations that live in each of these areas. The level of emergency preparedness necessary for a volcanic eruption could be better determined based on the findings of this study.

THE RELATIONSHIP BETWEEN WATERSHED BOUNDARIES AND ELEVATION IN MAINE

Caitlin Chamberlin ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Relationship Between Watershed Boundaries and Elevation In Maine was created using watershed, river and elevation data from the Maine Office of GIS. It shows how elevation has helped shape major watersheds in the state.

FISH DENSITY IN MAINE LAKES

Rich Crowley ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Fish Density in Maine Lakes map was created using ArcGIS and data from Public Education Access to Environmental Information in Maine (PEARL) as well as the Maine office of GIS. The map shows the abundance of fish species in the Department of Fish and Wildlife surveyed Maine lakes. The fish densities were match with their respective Maine lakes based on Maine Information Display and Analysis System (MIDAS) numbers. A hillshade background was added to provide better perspective on lake locations. Finally the Maine streams and rivers layer from the Maine office of GIS was added in order to fill in hydrological gaps in the data.

GULF OF MEXICO'S OFFSHORE OIL PLATFORM WIND POTENTIAL

Rich Crowley ('05), Environmental Studies

There are over 6000 natural resource drilling platforms in the Gulf of Mexico, all of which will become obsolete once their deposits are extracted. This study examined one of the possible alternate uses for these platforms, wind power potential. Using ArcGIS the number of platforms was reduced by weighting their distance from National Data Buoy Center wind speed collection points and water depth. Calculations were done to assess the optimal sites remaining, as well as provide an estimate of the energy potential for each site. Data for this project was obtained from the Minerals Management Service (MMS), United States Geological Service (USGS), and National Data Buoy Center (NDBC). A major limitation of this project was a lack of NDBC wind speed buoys, creating large data gaps and excluding many oil rigs that have otherwise high energy potential.

HISTOLOGICAL ANALYSIS OF LEUKOCYTE POPULATIONS IN ANTERIOR KIDNEYS OF SMALLMOUTH BASS (*MICROPTERUS DOLEMIEU*) AND WHITE SUCKERS (*CATOSTOMUS COMMERSONI*)

Lawrence M. Dagrosa ('05), Biology

Recent flow cytometric analysis by our laboratory has shown differences in the white blood cell populations present in the anterior kidneys of smallmouth bass (*Micropterus dolemieu*) and white suckers (*Catostomus commersoni*) harvested from the Androscoggin River. To further assess the leukocyte populations of these two species, enzyme staining techniques were optimized such that kidney sections could be stained for T cells, B lymphocytes, monocytes and neutrophils. Frozen 7 micron sections of bass and sucker anterior kidney samples were then compared histochemically. Using qualitative analysis of these sections we compared differences in histological structure between the anterior kidneys of the two species.

ATLAS OF MAINE: BEDROCK

Sarah Dunham ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Bedrock Geology of Maine map was created using data layers from the Maine Office of GIS, Geo Data Explorer, a United States Geological Survey interactive map, and a hillshade of the state. Data were processed using ArcGIS 9 and show the relationship of bedrock to fault direction and elevation.

FIRE HAZARD IN COCONINO COUNTY, ARIZONA**Sarah Dunham ('05), Environmental Studies**

Fire is a major management issue in the southwestern United States. Three spatial models of fire risk for Coconino County, Northern Arizona. These models were generated using thematic data layers depicting vegetation, elevation, wind speed and direction, and precipitation for January (winter), June (summer), and July (start of monsoon season). ArcGIS 9.0 was used to weight attributes in raster layers to reflect their influence on fire risk and to interpolate raster data layers from point data. Final models were generated using the raster calculator in the Spatial Analyst extension of ArcGIS 9.0. Ultimately, the unique combinations of variables resulted in three different models illustrating the change in fire risk during the year.

ROCK DETECTIVE'S APPROACH TO KAOLIN FOR GRADES K-12**Sarah Dunham ('05), Geology**

Rock Detective is a supplemental, hands on, investigative curriculum designed to lead students through critical components of the 1996 National Science Education Standards recommended by the NRC. Rock Detective is used nationally and internationally to introduce many of the fundamental concepts of Earth science to students in grades K-12. This curriculum is a series of mysteries that pose questions about given hand specimens. They are based on the pedagogy that students will be curious and remember things discovered. Because curiosity is encouraged during student engagement in the mysteries, the most difficult concepts become easy to understand and fun to learn about. To date, 203 grade specific mysteries have been designed and others are always being researched and constructed. Five mysteries were developed. Geography of the south eastern United States is utilized to help students understand the differences between igneous, sedimentary, and metamorphic rocks, as well as residual and sedimentary clay deposits. Each module focuses on various aspects of Kaolin including alteration of feldspars to clay, change in structure during heating, economic uses, as well as a brief conceptual introduction to X-ray diffraction. Each mystery also is an introduction to other concepts, such as geologic time and elemental composition.

IDENTIFICATION OF IL-4-PRODUCING CELLS IN MUTANT FSN/FSN MICE BY IMMUNOHISTOCHEMISTRY AND CONFOCAL MICROSCOPY**Cory Ernst ('05), Biology**

Systemic lupus erythematosus (SLE) is an autoimmune disorder characterized by the production of autoantibodies to cell-surface, cytosolic, and nuclear antigens. These autoantibodies form complexes with autoantigens that are released from dying or damaged cells. These complexes have the potential to block capillaries, causing kidney failure and death. In this study, the fsn/fsn mutant mouse is used as a model of SLE, which exhibits pathology similar to that in humans. Those homozygous for the fsn genetic mutation show a wide range of abnormalities. These include flaky skin, enlarged spleen and lymph nodes, and increased number of B cells and macrophages. There are also significantly high amounts of IL-4, the cytokine responsible for B cell activation. Thus, the components of the fsn/fsn immune system are extremely hyperactive. The goal of this study was to locate and identify IL-4 producing cells in spleens of fsn/fsn mice at different ages using immunohistochemistry and confocal microscopy. The results indicate that fsn/fsn mice produce significantly higher levels of IL-4 than normal littermates. Usually T cells are responsible for IL-4 production in the spleen. However, these results indicate higher complexity of IL-4 production. We have identified T cells producing IL-4 as expected, but also populations of T cells clearly not producing IL-4, as well as non-T cells that are IL-4 positive. We suspect that these non-T cell areas are germinal centers containing proliferating B cells.

SYNTHESIS AND CHARACTERIZATION OF OXYGEN-BRIDGED MULTI-OXACALIX[4]ARENES**Michael Feldman ('05), Chemistry**

Calixarenes represent a particularly interesting subset of molecules from the cyclophane family.

Their unique conformational structures, easy availability, and molecular recognition properties have made calixarenes an indispensable part of supramolecular chemistry. While more traditional carbon-bridged calixarenes, as well as some hetero-atom-bridged calixarenes have been heavily studied, oxygen bridged calixarenes have to some extent been left alone. While other groups have tried to synthesize multi-calixarenes, these attempts have largely failed due to the difficulty of creating annealed carbon structures. Utilizing the nucleophilic aromatic substitution calixarene formation reactions explored earlier by the Katz group, we have successfully synthesized multiple examples of both di- and tri- oxacalix[4]arenes. These compounds were characterized by standard methods including proton NMR, carbon-13 NMR, and X-ray crystallography. The multi-oxacalix[4]arenes that we have synthesized have particularly interesting conformational properties, taking on a 1,3-alternating structure that may allow for many binding pockets to be defined by the shape of the molecule.

TRANSPORTATION IN MAINE

Kevin W. Fritze ('07), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The Goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Transportation Map of Maine was created using data from the Maine Office of GIS, which was downloaded, converted, and in the case of the roads layer, over 600 cells had to be appended together. The main focus of the map is the road networks throughout the state, but rail lines and airports are also shown.

VIEWSHED ANALYSIS OF THE LANDS OF THE BELGRADE REGIONAL CONSERVATION ALLIANCE

Kevin W. Fritze ('07), Environmental Studies

The Belgrade Regional Conservation Alliance (BRCA) has acquired a great deal of land in the Belgrade Lakes region of Maine and is currently in negotiations on many pieces of land throughout the area. Data available online from the Maine Office of GIS, and data from the BRCA were used to carry out this analysis. One area of interest is Mount Phillip, the summit of which the BRCA recently acquired. There is a good view to the south of the mountain, but the potential view to the east and north is in question. This study analyzed the view from the top of the mountain, focusing on two landmarks: Mosher Hill to the east, and North Pond to the north. The analysis shows that both Mosher Hill and North Pond can be seen well from Mount Phillip. These results could help the BRCA both by adding weight to their negotiations to protect Mosher Hill, as well as influencing their decision whether or not to thin part of the forest on Mount Phillip to open up the view of North Pond that is currently blocked.

DOMINANCE VS. DIVERSITY: KIN RECOGNITION AND FEMALE MATE CHOICE IN ZEBRAFISH, *DANIO RERIO*

Rharaka Gilbert ('05), Biology

Kin recognition functions to avoid inbreeding and to assist relatives. In some species, it has been developed through olfactory cues given off by MHC proteins. Variability in MHC genes allows the individual to target a wider variety of viruses and bacteria. Therefore, females prefer to mate with individuals with dissimilar MHC genes. Females also prefer larger males to smaller males. In this study, zebrafish, *Danio rerio*, were used to test the hypothesis that females prefer to mate with males that will result in offspring with the most genetic diversity rather than dominance. This project revealed that females didn't spend more time with smaller males of a different genetic strain. Therefore MHC diversity is not more important in mate choice than dominance. This study also concluded, as previously discovered, that females prefer larger males to smaller males.

THE YELLOW BANDIT: THE IDENTIFICATION AND CHARACTERIZATION OF COLDWATER DISEASE PATHOGEN

Rharaka R. Gilbert ('05), Noah J. Hoffman ('05) and John E. Mahoney ('05), Biology

Maine's fresh water fishing industry is economically crucial. Recently, 200,000 lake trout fry died at the Gov. Hill Fish Hatchery in Augusta, ME due to bacterial Coldwater Disease. Bacterial samples taken upon fry necropsy were cultured and gDNA was extracted, and a hypervariable portion of the 16S rDNA was amplified. Using DGGE, 1 16S rDNA band was obtained, sequenced, and compared to known species in the BLAST database. Results indicated that the putative pathogen was *Flavobacterium* sp., which is the usual etiologic agent of Coldwater Disease. Upon subsequent observation of diseased hatchery brooding stock, lake and brook trout specimens were collected and samples were taken from the blood, slime, kidney, and spleen. *Flavobacterium psychrophilum*,

cultured and identified to cause Coldwater Disease in hatchery fry, was the suspected causative agent for the diseased adults. Samples were isolated in pure culture and compared with the BLAST database using 16S ribosomal DNA sequences. The results showed several gram-neg species but not *Flavobacterium*. Previous work in our lab has shown a correlation between bacterial Hg resistance and antibiotic resistance. As a result of this selective pressure and bacterial horizontal gene transfer, antibiotic resistance can become widespread and reduce treatment options for Coldwater Disease. In order to investigate the correlation between mercury and antibiotic resistance, Hg and antibiotic minimum inhibitory concentrations were determined for each isolate. Several strains showed high levels of resistance to both Hg and several different antibiotics, suggesting a correlation between their resistance levels and either the ability for horizontal gene transfer or mechanisms used to detoxify the antimicrobials.

RESISTANCE OF SOIL BACILLUS FROM DIFFERENT MAINE LOCATIONS TO MERCURY AND ANTIBIOTICS

Justin A. Guay, Biology

Prior research has suggested that microbial antibiotic resistance increases in parallel with mercury resistance. To explore this relationship *Bacillus* species were isolated from soil samples collected from four distinct Maine regions; Acadia National Park, Bridgton, Freeport and Greenville. Each species was identified through a combination of morphology, 16S Ribosomal DNA sequencing, and API 50 CH metabolic diagnostic testing. 16S DNA sequencing divided the 17 isolates into 4 groups of identical sequence. API 50 CH was used to further distinguish species within these groups by their ability to metabolize different carbohydrates. Each isolate was also subjected to Antibiotic MIC and Mercury resistance testing. PCR using \diamond Mercuric Reductase A \diamond specific primers were used to further screen for Mercury resistant isolates. Antibiotic resistance was compared as a function of mercury resistance and both traits were compared as functions of geographic origin and isolate species. From these results antibiotic and mercury resistance could be compared with regard to specific regions and species as an aid to future studies of the correlation between these two seemingly related resistance phenotypes.

STEREOSPECIFICITY OF THE DNA CROSS-LINKING REACTION OF DIEPOXYBUTANE.

Trevor C. Hanly ('07), Chemistry

Epidemiological studies indicate excess mortality from lymphatic and hematopoietic cancers among workers exposed to butadiene industrially. The lethal effects of butadiene have been attributed to its metabolite diepoxybutane (DEB), formed during mammalian detoxification by cytochrome P450. The bifunctional alkylating agent DEB forms interstrand cross-links between the N7 positions of deoxyguanosine residues on opposite strands of DNA at the duplex sequence 5 \diamond -GNC. We are using denaturing polyacrylamide gel electrophoresis to purify products resulting from reaction with optically pure stereoisomers (S,S, R,R and meso DEB) within a 209-base pair mitochondrial PCR product. Purified cross-links are subjected to piperidine cleavage followed by sequencing gel analysis to map the sites.

DEVELOPMENT OF MICROSATELLITE MARKERS IN *MEPHITIS MACROURA*

Noah J. Hoffman ('05) and Dr. Samantha M. Wisely ('05), Biology

Mephitis macroura, the hooded skunk, ranges from the southwestern United States into Mexico and Costa Rica. The goal of my research is to develop genetic markers for future population genetic studies of *M. macroura*. Specifically, I am developing microsatellite markers, which are long strings of tandemly repeated nucleotide bases. The number of these repeats at a given microsatellite loci is highly variable among individuals, meaning that there are multiple alleles for each microsatellite locus. However, the sequence on either side of the microsatellite is highly conserved allowing us to design PCR primers to amplify these loci in all individuals. Microsatellites can be used for a variety of molecular studies including individual identification, paternity analysis, social structure, and for population and species wide genetic studies. In order to develop microsatellite markers for this species, a DNA library enriched for GT repeats was created by Dr. Samantha Wisely at Kansas State University. At Colby, I amplified DNA from 96 of the library clones using PCR. I then sequenced clones that had inserts of the appropriate size to determine whether or not the samples were positive for microsatellites. Of the samples I sequenced, approximately 40% were positive for microsatellites. After identifying positive sequences, I used the web-based Primer3 program to design primers for each positive microsatellite in this species. These markers will eventually be used in a population genetics study of *M. macroura* with the goal of understanding the population biology of an important host of rabies.

EFFECTS OF DIRECT AND INDIRECT CUES OF PREDATION RISK ON SMALL RODENT FORAGING BEHAVIOR

Laura Hudecek ('05) and Patrick Ely ('05), Biology

EFFECTS OF DIRECT AND INDIRECT CUES OF PREDATION RISK ON SMALL RODENT FORAGING BEHAVIOR The foraging behavior of small nocturnal mammals may be influenced by many ecological factors such as competition and population dynamics. Among the most important and difficult to assess of these influences is that of predation risk. Indirect cues of predation risk, such as precipitation and moonlight may let prey know generally how easy they will be to detect. Direct cues, such as the odor of predator urine or the actual presence of a predator, may provide more specific information about the risk of predation. This study is an evaluation of the roles of both direct and indirect cues of predation risk on the foraging behavior of deer mice '*Peromyscus maniculatus*,' and southern red-backed voles '*Clethrionomys gapperi*.' It has been divided in to two sections. 1) Giving up densities (GUD) and the number of trips mice made to foraging trays were compared to temperature, precipitation, and moonlight intensity as indirect cues of predation risk. 2) GUDs and number of trips the mice made to each tray were compared with known predator activity by the use of motion sensitive cameras in view of the foraging trays. These comparisons allow for quantitative evaluation of the influences of both direct and indirect cues of predation risk on the foraging behavior of two small mammals, and provide insight into an important force governing community structure.

FORAGING BEHAVIOR OF THE GREEN ANOLE LIZARD (*ANOLIS CAROLINENSIS*) AFTER BURSTS OF EXERCISE

Carolyn P. Hunt ('05), Biology

Animals make choices when presented with different food types, especially in response to environmental or internal conditions. I predicted that the effects of anaerobic exercise would influence food type choice of *Anolis carolinensis*, because of the physiological need for carbohydrates imposed by exercise. This study shows that lizard foraging behavior changes as a response to this increased need to restore glycogen levels after exercise. In a sedentary control period, lizards were given the choice of eating wax worms or meal worms. During the experimental period, lizards ran on a treadmill to simulate short bursts of activity that are typical of lizards in the wild and were given the same food choice. Under sedentary conditions, lizards had no significant preference for either wax worms or meal worms. After exercise, lizards preferred to eat significantly more meal worms than wax worms. This change in food choice might be explained by the lizards' response to the different nutrient content of meal worms.

THE COLBY COLLEGE GREENHOUSE GAS EMISSIONS AUDIT

Carolyn P. Hunt ('05), Environmental Studies

This study compiled and analyzed a decade of institutional emissions data to assess the impact the Colby College has on global climate change. Each sector within the college, purchased electricity, on-campus oil use, transportation, solid waste, refrigerants, emits anthropogenic greenhouse gas. The audit converted use and consumption figures for each sector into carbon dioxide equivalencies for each of the six anthropogenic greenhouse gasses. With this data, we hope to enact policy changes within the school to meet greenhouse gas emission standards, such as those enacted by the Kyoto Protocol in 2005. Colby has already purchased green electricity, which has brought our emissions down to levels approaching our emissions in 1990.

ATLAS OF MAINE: MOOSE-VEHICLE COLLISIONS (MVC) IN THE STATE OF MAINE FROM 1992-2004.

Alexandra Jospe ('06), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The moose-vehicle collisions map was created using data from the Maine office of GIS, the Maine Department of Transportation, and the USGS. The data were projected in UTM zone 19, NAD83.

ESTIMATED NUMBER AND LOCATION OF FUTURE MOOSE-VEHICLE COLLISIONS (MVC) IN MAINE.

Alexandra Jospe ('06), Environmental Studies

Moose (*Alces alces*) are a keystone herbivore in Maine. Because of the large number of rural roads in Maine, there is a high rate of moose-vehicle collisions (MVCs), which is increasing. On-road encounters with animals resulted in 231 fatalities in the United States in 1999. Because of the fatality of MVCs, it is important to know where they are most likely to occur. I used GIS analysis to estimate where future MVCs would occur, factoring in the variables of land cover suitability for moose, distance from water bodies, locations of past MVCs, and speed limits on the roads. I ran four different analyses, each one weighting the variables equally. I also ran a regression to

determine if increasing road speed was associated with the increase in the number of MVCs per length of road. There was not a strong positive relationship between the number of MVCs per length of road and the speed limit, but it was interesting to note that there were more MVCs per length of road on 35mph and 40mph roads than on 45, 50, 55 or 65mph roads. Future research on MVCs would benefit from the inclusion of include moose population density and road traffic data.

A SPATIAL COMPARISON OF SHORT AND LONG TERM MIGRATION TRENDS IN CHINA

Stephen A. Kasperski ('05), Environmental Studies

China's floating population, those individuals who have migrated between counties or provinces for a period of longer than 6 months, account for 79 million individuals. If intracounty migration is also included, the number jumps to 145 million individuals or over 11% of the total population. This study examines the geographical differences in short and long term migration using ArcGIS to manipulate the spatial GIS data. The study shows that both short and long term migration (in absolute numbers) occurs more frequently near cities and in coastal regions. However, by normalizing the data by population size, the study eliminates the problems of population size on the size of the migrants. Using this normalized data, the study finds that western and northern counties have a large number of migrants present relative to the size of the population. Determining where this floating population migrates helps explain regional inequalities in employment opportunities.

EDUCATIONAL ASSESSMENT OF MAINE'S 11TH GRADERS

Steve Kasperski ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Educational Assessment of Maine was created using data from the Maine Office of GIS, the Maine Education Policy Research Institute, as well as the Maine Department of Education. The map shows 11th grade Maine Educational Assessment scores in 2004 for each district with a high school. The scores for each of the writing, reading, math, and science portions of the test were averaged into one score representing the district.

THREE-DIMENSIONAL GRAPHITIZED PLANT FOSSILS FROM THE FIRST UPRIGHT PLANTS ON EARTH: TROUT VALLEY FORMATION, NORTH-CENTRAL MAINE

Newton W. Krumdieck ('07), Geology

The early Middle Devonian Trout Valley Formation of north-central Maine is famous for well-preserved remains of the first upright land plants, including *Pertica quadrifaria*, official state fossil of Maine. It also serves as the model for early terrestrial ecosystems. The formation is predominantly sandstones and siltstones from an alluvial fan-deltaic-tideflat environment originating in the Acadian Mountains and flowing into a Devonian sea. Plant remains in the streams became deposited as part of the record; heat from underlying magma that became the Traveler Mountain Rhyolite and Katahdin Granite graphitized included fossils, a process rare without concurrent high-pressure flattening. Transported specimens from both the depositional sequence and an upstream paleosol were studied. Plant specimens were previously described from two-dimensional plate fossils, coming from split rock layers. The objective of this research was to correlate between these and new specimens which were preserved three-dimensionally. Approximately 10 kg of the Trout Valley paleosol was dissolved in 48% HF. Remaining insoluble materials were washed with water over a 0.3 mm screen, then re-sieved into discrete size classes from 0.5 mm to 2.0 mm. Samples were then inspected under a dissecting microscope and promising remains removed for further study. Potentially identifiable fragments were found from many plants, the most readily identifiable and plentiful being from four species: *Pertica quadrifaria*, *Psilophyton* cf. *P. forbesii*, *P. microspinum* and *Kaulangiophyton akantha*. Possible charcoal fragments have implications for early evolution of an oxygen-rich atmosphere. Other taxa are likely present.

2004 DISTRIBUTION OF BROOD TROUT STOCKINGS FOR THE STATE OF MAINE

Theodore F. McDermott ('06), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES 212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. 2004 Distribution of Brood Trout Stockings For The State of Maine was created using data from the Maine Department of Inland Fisheries and Wildlife regarding the placement of trout in ponds and lakes across Maine. The geographic distribution of four species of trout was mapped by joining the trout distribution layer to a layer that includes all bodies of water in the state.

ANALYSIS OF FUTURE CONSTRUCTION POSSIBILITIES ON THE COLBY COLLEGE CAMPUS

Theodore F. McDermott ('06), Environmental Studies

With the recent construction of Colby Green and the current plans for the construction of several new buildings, the total area for future development on campus has declined. The goal of this study was to illustrate existing campus development and to determine where future growth could occur. GIS was used to in determining the different soil systems on campus, the current use of the land, and the boundaries of the Colby property. The project shows what potential obstacles the college will have in attempting to expand the campus and proposes where the best options are for construction are.

A PRELIMINARY HABITAT SUITABILITY ANALYSIS FOR THE RESTORATION OF SOUTH CHINA TIGERS IN THE HUPINGSHAN RESERVE, CHINA

Rob Mehlich ('05), Environmental Studies

The South China tiger, *Panthera tigris amoyensis*, once roamed the greater part of southern China. However, expanding human populations and other anthropogenic effects have resulted in the extinction of the wild population. The Chinese government has expressed interest in a reintroduction program for this species of tigers. Recent studies suggest that the Hupingshan preserve is potentially a good candidate for a tiger reintroduction program. Hupingshan is located on the border of the Hunan and Hubei provinces in Southern China. This study was a preliminary habitat suitability analysis, for the restoration of South China tigers in the Hupingshan reserve, China. ArcGIS 9.0 was used to develop a model that combined roads, railroads, slope, land cover, park classification, and population density. The tiger habitat suitability analysis was performed by weighting and combining the various layers. Preliminary results suggest that the Hupingshan reserve is suitable habitat for the reintroduction of South China tigers.

ATLAS OF MAINE: USGS TOPOGRAPHIC MAPS OVER A HILLSHADED DIGITAL ELEVATION MODEL

Rob Mehlich ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The USGS Topographic Maps Over a Hillshaded Digital Elevation Model was created using ArcGIS 9.0. U.S. geologic survey 7.5 minute topographic maps at a scale of 1:24 000 for the entire state of Maine were placed over a hillshaded digital elevation model for the entire state of Maine. The topographic maps were set at 40% transparency to allow elevational features to be more pronounced.

CONDITIONED TASTE AVERSION IN MICE (*MUS MUSCULUS*)

Julia Morrison ('05), Biology

Taste aversion is an example of a learned behavior that enables animals to choose foods that are beneficial, while avoiding the repeated ingestion of foods that are harmful. Laboratory mice (*Mus musculus*) are known to exhibit learned taste aversions to different stimuli that are subsequently paired with nausea or illness. This study tested the hypothesis that the development of a taste aversion is influenced by the strength of the unconditioned stimulus (3% and 10% ethanol) and by the novelty of the conditioned stimulus (orange and cherry flavored water). I also studied how long the aversion to the flavor persisted after it was no longer paired with ethanol. The data supported the predictions that mice trained with 10% ethanol learn the aversion faster and maintain those aversions longer than mice trained with 3% ethanol. Statistically significant data supported the prediction that when ethanol is present at the first encounter with the flavor, rather than being delayed to later trials, the mice would develop an aversion more quickly. These mice also maintained their aversion somewhat longer after the alcohol was removed, but the differences fell short of being statistically significant. Results supported the overall hypothesis that learning a taste aversion is enhanced by the strength of the unconditioned stimulus (ethanol) and by the novelty of the conditioned stimulus (flavor).

ATLAS OF MAINE: A MAP OF IMPOUNDMENTS AND THEIR PRIMARY PURPOSE ON MAINE RIVERS

Sophia S. Newbury ('08), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Maine Impoundments and Their Primary Purpose map shows all of the dams in Maine and categorizes

them based off of their primary purpose. The data was downloaded from the Maine office of GIS and classified to show the primary purpose of these dams.

ANALYSIS OF ANTIMICROBIAL PEPTIDES IN AMPHIBIAN SKIN SECRETIONS

Jillian E. Parker ('05) and J. Michael Conlon ('05), Biology

A remarkable variety of compounds are synthesized and secreted in anuran amphibian skin. These serve primarily to protect the animal from predators and pathogens. In this presentation, we review results of studies in which skin secretions were collected from ranid frogs in the bullfrog and leopard frog species groups. Peptide components were purified using reverse-phase HPLC. Structural characterization of the peptides and antimicrobial assays have revealed several families of antimicrobial peptides. Each peptide also has a species-specific amino acid sequence. The distribution of these peptides in North American ranid frogs is important to understand for phylogenetic analyses of members of the two groups and in light of recent amphibian population declines that may be caused by diseases such as the chytrid fungus, *Batrachochytrium dendrobatidis*. For example, ranalexin is synthesized by *Rana catesbeiana*, *R. grylio*, *R. clamitans*, and *R. virgatipes*, but was not found in skin secretions from *R. septentrionalis*. On the other hand, four paralogs of brevinin-1, a family of peptides widely distributed in the skins of Eurasian ranids and North American ranids in the leopard frog group, were isolated from secretions from *R. septentrionalis*. We are currently developing methods for purifying peptides from amphibian skin to further investigate interspecific and geographic variation in the peptides, and their effectiveness on local microbial fauna.

CHARACTERIZATION OF MERCURY AND ANTIBIOTIC RESISTANCE DETERMINANTS IN SALMONID GASTROINTESTINAL BACTERIA

Erin Parry ('06) and Matt Meredith ('06), Biology

Atmospheric mercury (Hg) deposition has resulted in elevated levels of mercury in Maine rivers and lakes, and has prompted several recent fish consumption advisories by the EPA. A 2005 study on mercury in Maine conducted by the BioDiversity Research Institute in Falmouth, Maine has attracted national attention regarding mercury distribution in Maine bodies of water, soil, fish, and piscivorous birds. Bacterial isolates obtained from the gastrointestinal tracts of salmonids in the past two years have been found to show high levels of resistance to HgCl₂ and organic mercury (phenylmercuric acetate), as well as resistance to multiple antibiotics. Previously, these resistance patterns among bacterial isolates were documented phenotypically, although the resistance determinants had not been characterized. *merA*, the gene encoding mercuric reductase has been amplified and sequenced in some mercury resistant isolates, including a *Salmonella* sp. and *Pseudomonas* sp.. Hypothetical *merA* amplicons have been found in almost all the remaining isolates. Antibiotic resistance genes were identified via PCR and DNA sequencing. Additionally, several of these genes were found on mobile genetic elements that have been previously documented to be capable of horizontal gene transfer by the mechanism of transformation. We also report that mobile genetic elements containing antibiotic resistant genes from a gram positive donor, *Carnobacterium* sp., can be transferred through conjugation to the gram negative fish pathogen, *Aeromonas salmonicida*.

CHAOS AND FRACTALS: A TASTE OF NONLINEAR DYNAMICS

Seth Pierrepont ('05), Mathematics

This talk provides a trip into the world of nonlinear dynamics to view chaos and fractals in both continuous and discrete systems. The talk starts along a path of simple definitions and concepts that will provide the necessary background to understand chaos and fractals in a general sense. The talk then comes to a fork, a bifurcation perhaps, as it splits from a general overview into two specific examinations of chaos and fractals in two different types of systems: continuous and discrete. For continuous systems, the focus will be on the Lorenz equations and the notion of a strange attractor, looking at the butterfly effect in three dimensional space. For discrete systems, the goal is to comprehend the magnificent Mandelbrot set and its index of Julia sets through a series of interactive applets and pictures. In short, this talk will trace the mathematical path that leads to some of the most beautiful geometric shapes in mathematics.

SYNTHESIS AND CHARACTERIZATION OF PYRIDINE-BASED BICYCLOOXACALIXARENES

Kevin J. Selby ('05), Chemistry

Novel bicycloodacalixarenes were synthesized in high yield via a selective, room temperature SNAr reaction of phluoroglucinol with 2,6-dichloropyridines. Functionality on the 2,6-dichloropyridine was varied by changing the electron-withdrawing groups in the 3 and 5 positions (using chlorine, nitro groups, and cyano groups) and the side-chains in the 4-position (using ethyl, butyl, phenyl and p-tolyl groups). The resulting cage-like molecules were studied by X-ray crystallography and

tested for metal complexation.

ATLAS OF MAINE - URBAN SPRAWL: POPULATION MIGRATION FROM 1990-2003

Conor Semler ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Urban Sprawl map was created using population density data from the US Census Bureau from 1990 and 2003, and shows movement of population. The data indicates that central city areas declined in population, while areas on the periphery experienced the most increase.

MONEY AND EDUCATION: HOW ECONOMIC DISTRIBUTION CORRESPONDS TO ACADEMIC SUCCESS

Conor Semler ('05), Environmental Studies

Urban sprawl is a significant issue in the United States, one effect of which is the departure of the wealth from cities. This study examined the distribution of wealth in Erie County, New York, focused around Buffalo. The question is then raised, why do those with the money leave the city, and to where do they go? While this study does not attempt to explain all of the reasons, it does examine two significant issues: quality of public school education, and proximity to main highways with easy access to the city. Using ArcGIS, I was able to place the public high schools and their relative ranking over a distribution of per capita income. The results of this analysis show that the wealthiest areas are located within the best school districts. Moreover, the areas where the wealth accumulates are directly connected by major highways.

A GIS SUITABILITY ANALYSIS OF WOLF HABITAT IN MAINE

Wendy A. Sicard ('05), Environmental Studies

The range of the Gray Wolf (*Canis lupus*), once covering most of North America, has been drastically reduced by an estimated 95% due to habitat loss and extermination by humans. The wolf was extirpated from Maine in the 1800s. Wolf reintroductions have been suggested for Maine, but there is some debate about how much land is suitable for wolves. I developed a wolf habitat suitability analysis using ArcGIS and data from the Maine Office of GIS and the United States National Atlas. The model incorporates land cover, presence of major roads and railways, conservation land, industrial, non-industrial, and public woodlot ownership, distance from major points of population, deer population, and slope. The model results show areas of high and low wolf suitability in Maine. The model suggests that the best potential habitat for wolves in Maine is situated in the northwest of the state. Possible future reintroductions or natural colonization from other areas would have the highest likelihood of survival in these areas.

MAINE ATLAS: WILDLIFE HABITAT

Wendy Sicard ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. Wildlife Habitat was created using data from the Maine Office of GIS and the United States National Atlas. The map shows the land cover characteristics of Maine, including human development and major roads. The most suitable wildlife habitat can be attributed to the areas with the most suitable land cover and the least human development. An inset map shows overall habitat values for 91 priority trust species of the U.S. Fish & Wildlife Service, within forested cover types.

PHYSIOLOGICAL AND BEHAVIORAL EFFECTS OF CAFFEINE INGESTION AND VOLUNTARY WHEEL RUNNING IN FEMALE MICE (*MUS MUSCULUS*)

Kathryn A. Slemp ('05), Biology

Caffeine has been shown to stimulate physical activity in mammals, and acute exercise results in stimulation of several physiological systems in males of several mammalian species. Little is known about how female mammals respond to these introduced stimuli. In this study, I tested the hypothesis that female lab mice (*Mus musculus*) exhibit changes in body condition, metabolism and biochemical characteristics of muscle and blood to a stimulant (caffeine) and exercise (voluntary wheel running). I measured body mass, resting metabolic rate, blood glucose levels, plasma hematocrit, and activity levels of aerobic and anaerobic enzymes in heart and leg muscles. I compared values in mice receiving each treatment to those maintained under controlled conditions. Few significant differences were detected in any of the six variables. Further

investigation is necessary before explicit conclusions can be drawn.

AFFORDABLE HOUSING IN KENNEBEC COUNTY

William G. Stohner ('05), Environmental Studies

The U.S. Department of Housing and Urban Development defines affordable housing as a household paying no more than 30 percent of its annual income on housing. That is, families who pay more than 30 percent of their income on housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, healthcare, and transportation. This project focused on Kennebec County, Maine. Between 1990 and 2000, market demand for housing increased at a faster rate than did the supply of housing. Despite the addition of 6,719 homes, the average home price increased faster than average household income. This raises the question of just how many households in Kennebec County are facing unaffordable housing. Using shapefiles and data provided by the US Census Bureau, a map was created with ArcGIS to illustrate the percentage of households, down to the Census Block level of detail, that are paying more than 30 percent of their income to housing. By looking at this information I was able to get a better picture of the housing situation and where in the county households are having the hardest time meeting their needs. The results indicate that households in the more urbanized sections of the county are more likely than rurally located households to be facing unaffordable housing. Namely, Waterville and Augusta held the highest percentage of households paying more than 30 percent of their income for housing.

CHANGES IN MAINE'S UNEMPLOYMENT RATE

William G. Stohner ('05), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. Changes in Maine's Unemployment Rates was created using data and shapefiles provided by the US Census Bureau and shows changes in unemployment rates within labor market areas between January 2004 and January 2005. Overall, there has been a general decrease in unemployment rates throughout the state.

SEQUENCING OF A CDNA ENCODING A FULL LENGTH VERSION OF THE PKABA1 INTERACTING PROTEIN TAWD40 AND PREPARATION FOR PROTEIN EXPRESSION

Natalie A. Wayne ('06), Biology

The study of abscisic acid (ABA)-mediated gene expression is important to the understanding of plant responses to this hormone, which affects plant growth, development and responses to environmental stresses. PKABA1 is an ABA-induced protein kinase involved in ABA-suppressed gene expression in cereal grains. The study of PKABA1-interacting proteins such as TaWD40, which has previously been shown to physically interact with PKABA1, is useful in studying the effects of PKABA1-mediated signaling. Sequencing of a 1.9 Kb full-length TaWD40 cDNA clone(CK210682) has been completed. The amino acid sequence of TaWD40 was determined from the cDNA sequence. The TaWD40 protein was found to contain a N-terminal U-box and 7WD40 repeats, suggesting it may belong to the family of E3 ubiquitin ligases. Therefore, TaWD40 may be involved in regulating PKABA1 by targeting it for degradation via the ubiquitin-proteasome pathway. Now that sequencing has been completed, the CK210682 cDNA is currently being cloned into the pRSET-A plasmid for protein expression and further study of the TaWD40 protein.

SEX DIFFERENCES IN ENVIRONMENT-DEPENDENT ETHANOL TOLERANCE IN C57BL/6 MICE

Kelly Wheaton ('05), Psychology

Male mice which receive regular ethanol injections in a standardized environment develop environment dependent tolerance (EDT) to the hypothermic and hypnotic effects of ethanol. EDT research comparing males and females has not been conducted despite sex related differences found in initial ethanol sensitivity and tolerance acquisition. It was predicted that female mice would demonstrate EDT to a greater extent because of their faster rate of tolerance and habituation. To test this, male and female C57BL/6 mice were injected with ethanol twice a day for four days in a standardized environment. On the fifth day, mice were injected in either the cued environment or a novel environment. As previous research indicated, males injected in the novel environment slept significantly longer than males injected in the cued environment. Females injected in the novel environment slept significantly less and showed an increase in temperature when compared to those females injected in the cued environment. This suggests that female C57BL/6 mice do not demonstrate EDT to the hypnotic and hypothermic effects of ethanol. This

may be attributed to an increase in locomotor activity and temperature when presented with a novel environment. Future studies focusing on the effect locomotion and extent of environmental novelty are necessary to elucidate these findings.

AVERAGE ANNUAL PRECIPITATION IN MAINE

Emily Wilbert ('07), Environmental Studies

This map was developed as part of the Atlas of Maine, a project carried out by students in ES212: Introduction to GIS and Remote Sensing. The goal of this project was to develop a series of visually striking maps illustrating Maine's unique natural and human resources. The Average Annual Precipitation Map of Maine was created using ArcMap with data from the Maine Office of GIS and National Atlas websites. It shows the average annual precipitation from 1961-1990 by watershed.

DETAILED MAP AND RECREATIONAL SUITABILITY ASSESSMENT OF THE COLBY TRAIL SYSTEM

Emily Wilbert ('07), Environmental Studies

This map is designed as a resource for students and the public to use and develop a better understanding of the trails system on the Colby Campus. I used a Garmin GPSmap 60CS to chart all the trails on Runnals Hill and in the Arboretum. Then, using ArcGIS, I compiled the tracked trails and laid them over an aerial photo of the campus. Because many of the trails are hard to find, I took digital photos of each trail entry to help the user locate them. Then, by taking note of the grade and width of the trail, I decided which trails were suitable for certain activities. This gives users an idea of where to go for walking, running, mountain biking, cross-country skiing, and snowshoeing.

GEOLOGICAL AND HISTORICAL INVESTIGATION OF THE BELGRADE LAKES WATERSHED

Mallory C. Young ('05), Geology

The Belgrade Lakes watershed includes six interconnected lakes and represents an important water and recreational resource in central Maine. The present geographical configuration of this watershed has been significantly modified by the construction of seven dams for water control and the generation of hydroelectric power over the past 100 years. The purpose of this investigation was to understand and document the impacts of these dams on the evolution of this lake system. Preliminary data on each dam was obtained from the Maine Emergency Management Agency and included date of construction (1896 to 1989), length (6.7-76.1 m), structural height (0-7 m), and hydraulic height (0.3-5.5 m). Longitude and latitude of each dam was obtained in the field using GPS. These data were integrated into a GIS mapping program and depth maps for each of the six lakes were constructed. Using hydraulic height values to the closest meter for the dams the original geographic extent, volumetric changes ranging from 1.0×10^6 to 14.0×10^6 m³ and changes in surface area percent ranging from 12 to 43 % for each lake were determined. Adding dates of dam construction, changes to aerial extent of the lakes in the watershed were mapped in a historical context. It is clear that this region would have looked significantly different had the dams, beginning in 1896, not been constructed. Results of this investigation provide a historical context and an important foundation for long-term hydrogeochemical and geochemical investigations of this watershed.

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Colby Undergraduate Research Symposium 2005

April 27-29, Colby College, Waterville, Maine

Keynote Address - Dr. Sandra Steingraber
April 27, 7:30 pm Olin 1
Honors Programs

2005 Program

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Research Symposium

Author	Department	Mentor	Location
Title			Date Time
Nathaniel Hulme ('05)	American Studies	McFadden, Margaret T.	
Evolution of Gay Marriage as an Issue in the Late 20th Century			:
Emma Lynch ('05)	American Studies	McFadden, Margaret T.	
Intersections of Environmentalism and American Society			:
Emma Lynch ('05)	American Studies	McFadden, Margaret T.	Smith Room
If You Build it, They Will Come: A History of Changing Notions of Wilderness Along the Appalachian Trail			April 29
Nathaniel Hulme ('05)	American Studies	McFadden, Margaret T.	Smith Room
Marriage and Family: A Closer Look into the Debate over Same-Sex Marriage			April 29
Josiah Taylor ('05)	Anthropology	Anderson, Jeffrey	

		D.	
Interpreting Land and Culture through Word and Image			:
Slipp, Patrick J. ('05)	Biology	Hannum, Lynn	
A Study of Innate Immune Function in Fish of the Androscoggin River			:
Durant, Lydia R. ('05)	Biology	Tilden, Andrea R.	
Not yet determined			:
Sherry, Maureen M. ('05)	Biology	Johnson, Russell R.	
Overexpression and purification of PKABA1, TaABF, and TaWD40, three cereal grain proteins			:
Slemp, Kathryn A. ('05)	Biology	Bevier, Catherine R.	
Physiological and Behavioral Effects of Diet and Exercise in House Mice			:
Morash, Joel G. ('05)	Biology	Hannum, Lynn	
The presence of circadian rhythms in the innate immune system of zebra fish			:
Lindsay E. Begin ('05)	Biology	Stone, Judy L.	
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Luth, Eric S. ('05)	Biology	Tilden, Andrea R.	
Neuromodulation and Biological Rhythms in Crustaceans			:
Jocelyn J. LeBlanc ('05)	Biology	Tilden, Andrea R.	
Neuromodulatory Role of the Environment on the Crustacean Nervous System.			:
Kathryn A. Slemp ('05)	Biology	Bevier, Catherine R.	
Physiological and Behavioral Effects of Caffeine Ingestion and Voluntary Wheel Running in Female Mice (<i>Mus musculus</i>)			:
Eric S. Luth ('05)	Biology	Tilden, Andrea R.	Whitney Room
Determining the Specific Sites and Patterns of Melatonin Production in the Fiddler Crab, <i>Uca pugnator</i>			April 29
Jocelyn J. LeBlanc ('05)	Biology	Tilden, Andrea R.	Whitney Room
Endogenous Rhythmicity of Retinal Photosensitivity in the Fiddler Crab, <i>Uca pugnator</i>.			April 29
Lydia R. Durant ('05)	Biology	Tilden, Andrea R.	Whitney Room
Exploring the Ability of Melatonin to Reduce Oxidative Stress in Fiddler Crab			April 29

Hepatopancreas Cells			
Maureen M. Sherry ('05)	Biology	Johnson, Russell R.	Whitney Room
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Hutton, Devon E. ('05)	Chemistry	Rowe, Rebecca J.	
Exploring the Mechanism of the Pinacol Coupling Reaction			:
Lees, Jonathan P. ('05)	Chemistry	Shattuck, Thomas W.	
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Debelouchina, Galia T. ('05)	Chemistry	Shattuck, Thomas W.	
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Rittner, Katherine N. ('05)	Chemistry	Millard, Julie T.	
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Campfield, Amy E. ('05)	Chemistry	Katz, Jeffrey L.	
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Kung, Yan ('05)	Chemistry	Dunham, Stephen Uldrich	
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Sigalow, Kathryn L. ('05)	Chemistry	Katz, Jeffrey L.	
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Feldman, Michael B. ('05)	Chemistry	Katz, Jeffrey L.	
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Zheleva, Vasilena P. ('05)	Chemistry	Conry, Rebecca R.	
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Pitter, Kenneth L. ('05)	Chemistry	King, D. Whitney	
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Raymond, Richard L. ('05)	Chemistry	Dunham, Stephen Uldrich	

The Structural and Functional Characterization of a Pb-Binding Protein			:
Cole, John S., III ('05)	Chemistry	Conry, Rebecca R.	
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Walsh, Michael J. ('05)	Chemistry	King, D. Whitney	
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Michael Feldman ('05)	Chemistry	Katz, Jeffrey L.	
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Kevin J. Selby ('05)	Chemistry	Katz, Jeffrey L.	
Synthesis and Characterization of Pyridine-based Bicyclooxacalixarenes			:
Selby, Kevin J. ('05)	Chemistry	Katz, Jeffrey L.	
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Presolski, Stanislav I. ('05)	Chemistry	Thamattoor, Dasan M.	
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Newhouse, Timothy R. ('05)	Chemistry	Thamattoor, Dasan M.	
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John Cole ('05)	Chemistry	Thamattoor, Dasan M.	
The Synthesis of Biomimetic Complexes for Tungsten and Molybdenum Enzymes			:
Mihajlov, Ivan T. ('05)	Chemistry	King, D. Whitney	
Winter Nitrogen and Phosphorus Nutrient Dynamics of Belgrade Lakes			:
Timothy Newhouse ('05)	Chemistry	Thamattoor, Dasan M.	Whitney Room
Rod-and-Panel Macrocycles			April 28
Ries, Christopher M. ('05)	Computer Science	Bilar, Daniel	
Automated Identification of Malicious Code Variants			:
Spitler, Russell A. ('05)	Computer Science	Skrien, Dale J.	
Implementing a Security Scanner for Java Code			:
Fillebrown, Catherine M. ('05)	East Asian Studies	Besio, Kimberly A.	
The Daguan Yuan and the Contemporary Chinese Imagination			:

Catherine Fillebrown ('05)	East Asian Studies	Besio, Kimberly A.	Hurd Room
Two Contemporary Representations of Honglou Meng			April 28 40 minutes
Nadel, Gillian S. ('05)	English	Spark, Debra A.	
A collection of Short Stories			:
Robbins, Toni-Lynn ('05)	English	Bryant, Cedric Gael	
Ancient Mythologies: Shedding Light on Modernist Texts			:
Hinkle, Melisse P. ('05)	English	Tatelbaum, Linda	
Barbara Kingsolver: Unveiling the Heart of the Human Condition through Nature			:
Medlin, Mary G. ('05)	English	Spark, Debra A.	
Creative Writing -- Collection of Short Stories			:
Dennehy, Caitlin A. ('05)	English	Spark, Debra A.	
Creative Writing Honors Thesis			:
Sheinbaum, Rachael L. ('05)	English	Onion, Patricia A.	
Education for the Oppressed: An Examination of the Effects of Literacy on Minority Groups in America			:
Johnson, Elizabeth C. ('05)	English	Thorn, Jennifer J.	
Gender, Modernism and the Canon: A Reception Study and Reading of Three Great Women Writers			:
Nisetich, Rebecca S. ('05)	English	Bryant, Cedric Gael	
Maternal and Cultural Influences on Individual Identity in the Novels of Toni Morrison and William Faulkner			:
Hanzlik, Paige E. ('05)	English	Narin van Court, Elisa M.	
Motivations Behind The Reinvention of the Arthurian Tradition			:
Ritchie, Rachel R. ('05)	English	Sagaser, Elizabeth H.	
Poetry and Spirituality: A study of Emily Dickinson and John Donne			:
Orr, Andrew C. ('05)	English	Bryant, Cedric Gael	
Power Plays in William Faulkner			:
Smith, Lauren M. ('05)	English	Sadoff, Ira	
Social and Economic Contexts in the Short Stories of Carver, Cheever, and Others			:

Moore, Todd W. ('05)	English	Narin van Court, Elisa M.	
The Evolution of Twentieth-Century Responses to War in Fantasy/Science-Fiction			:
MacDonald, Ann H. ('05)	English	Bryant, Cedric Gael	
The Extraordinary Ordinary West: Humanity and Realism in McMurtry's Old West Narratives			:
Quigley, Nathan A. ('05)	English	Osborne, Laurie E.	
The Language of Detectives			:
Beetz, Jessica L. ('05)	English	Burke, Michael D.	
The Use and Characterization of Rivers in Modern Literature			:
Eilefson, Sarah L. ('05)	English	Bryant, Cedric Gael	
Tim O'Brien and Film: Accessing and Responding to War			:
Pappas, Catherine B. ('05)	English	Osborne, Laurie E.	
Witchcraft and Insanity, a Dramatic Production of William Shakespeare's 'Macbeth'			:
King, Michael W. ('05)	English	Sagaser, Elizabeth H.	
Writing Poems			:
Barmash, Michele A. ('05)	English	Mannocchi, Phyllis F.	
Mother and Daughter Relationships in Canadian Literature			:
Hernandez, Melissa A. ('05)	English	Contreras, Daniel	
Sew and Tell: Making Rebozos, Stories and Thinking About Sandra Cisneros's Caramelo			:
Andrew Orr ('05)	English	Bryant, Cedric Gael	Smith Room
Knowing the Void, Hearing the Sound, and Ordering the Fury: Faulkner's Agency, Through Art, from The Sound and the Fury to Absalom, Absalom!			April 28
Rebecca Nisetich ('05)	English	Bryant, Cedric Gael	Smith Room
Maternal and Cultural Influences on Individual Identity in the Novels of Toni Morrison and William Faulkner			April 28
Beetz, Jessica L. ('05)	Environmental Studies	Nyhus, Philip	
An Examination of Human Wildlife Conflicts			:
Carroll, Brendan J. ('05)	Environmental Studies	Botcheva-Andonova, Liliana	
State Policy Responses to Global Climate Change			:

Stewart, Allison M. ('05)	Environmental Studies	Fleming, James R.	
The History and Importance of American Beech Trees in New England			:
Jessica Beetz ('05)	Environmental Studies	Nyhus, Philip	Hurd Room
The Role of Private Ownership in the Conservation of Exotic Species			April 29
Brendan Carroll ('05)	Environmental Studies	Nyhus, Philip	Hurd Room
The Transboundary Implications of Wolf Reintroduction and Recovery in Maine			April 29
Allison Stewart ('05)	Environmental Studies	Fleming, James R.	Hurd Room
The Forest Service's Quest for Power and Money and its Implications for the American Public			April 29 Honors Project
Rutherford, Michael W. ('05)	Government	Maisel, L. Sandy	
Presidential Management, Fiscal Policy, and Public Rhetoric: An Empirical Investigation of Public Discourse and the Federal Budget			:
Brodalka, Pawel ('05)	Government	Yoder, Jennifer A.	
The Development of a Party System in Poland Since 1989: The Continuity and Adaptation Strategies of Post-Communist, Post-Solidarity and Peasant Parties.			:
Kassin, Marc J. ('05)	Government	Maisel, L. Sandy	
The Effects of the Presidential Debate on Public Opinion: From Carter v. Ford to Bush v. Kerry			:
Michael Rutherford ('05)	Government	Maisel, L. Sandy	Whitney Room
Presidential Management, Fiscal Policy, and Public Rhetoric: An Empirical Investigation of Public Discourse and the Federal Budget			April 28
Slack, Austin B., IV ('05)	History	Opal, Jason M.	
The Belief System Behind Today's Republican Party			:
Harvey, Adam J. ('05)	History	Leonard, Elizabeth D.	
The Maine Supreme Judicial Court and the Civil War			:
Poplack, Aaron R. ('05)	History	Opal, Jason M.	
Turnpikes and the Market Economy			:
Aaron Poplack ('05)	History	Opal, Jason M.	Hurd Room
Road Rage: The Turnpike Debate In Dedham, Massachusetts, 1801-1803			April 28

Adam Harvey ('05)	History	Leonard, Elizabeth D.	Hurd Room
The Maine Supreme Judicial Court and the Battle Over National Identity During the Civil War			April 28
Cai, Adelin ('05)	International Studies	Anderson, Jeffrey D.	
Manufacturing Visibility: Strategies of Empowerment in Indigenous Rainforest Communities			:
Hill, Erica L. ('05)	International Studies	Franko, Patrice M.	
The Liberalization of Village Banking in Guatemala			:
Honig, Emily J. ('05)	International Studies	Hatch, Walter F.	
Governmental Resistance in International Intellectual Property Rights			:
Dubois, Justin ('05)	International Studies	Yoder, Jennifer A.	
Winners of the Extension of National Membership: Have New Laws Brought the Desired Results for Foreigners in Germany			:
Justin Dubois ('05)	International Studies	Yoder, Jennifer A.	Smith Room
Extension of National Membership: Government Promises, Immigrant Expectations and the Impact on the Foreign Population in Germany			April 28
Emily Honig ('05)	International Studies	Hatch, Walter F.	Smith Room
Governmental Resistance in International Intellectual Property Rights			April 28
Erica Hill ('05)	International Studies	Patrice M. Franko	Smith Room
The Liberalization of Village Banking in Guatemala			April 28 30 minutes
Reyes, Gabriel ('05)	Latin-American Studies	Fallow, Ben W.	
Comparative Study of Democracy and Development in Venezuela			:
Gabriel Reyes ('05)	Latin-American Studies	Fallow, Ben W.	Whitney Room
The Continuous Struggle for Representation in the Venezuelan State			April 28
Lipton, Brandy J. ('05)	Mathematics	Gouvea, Fernando Q.	
Adventures in Fourier Analysis (this is a temporary title :-))			:
Falk, James D. H. ('05)	Mathematics	Berger, Thomas R.	
Group and Representation Theory			:
Van Wagenen, Christopher P. ('05)	Mathematics	Gouvea, Fernando Q.	
Quadratic and Higher Order Reciprocity			:

Kulow, Torrey K. ('05)	Mathematics	Berger, Thomas R.	
the mathematical experience			:
Telis, Alexander L. ('05)	Philosophy	Gordon, Jill P.	
An Inquiry Into the Convergence of Religious Imperatives and Secular Ethics			:
Surprenant, Christopher W. ('05)	Philosophy	Calhoun, Cheshire C.	
Deriving Political Philosophy from Kant's Ethical Theory			:
Widdersheim, Michael M. ('05)	Philosophy	Cohen, Daniel H.	
Jurgen Habermas: The Theory of Communicative Action			:
Burd, Megan C. ('05)	Philosophy	Cohen, Daniel H.	
Meeting the Mystics: How Can We Know?			:
Given, Emily A. ('05)	Philosophy	Calhoun, Cheshire C.	
On Feminist Epistemology: Communities as Knowers			:
Kahn, Joshua L. ('05)	Philosophy	McArthur, Robert L.	
Separating the Good from the Great - Objective Value in Music			:
Seifert, Daniel M. ('05)	Philosophy	Cohen, Daniel H.	
The Philosophical Aspects and Implications of Humor			:
Christopher Surprenant ('05)	Philosophy	Calhoun, Cheshire C.	Smith Room
Cultivating a Good Will: Moral Progress and the Kantian State			April 29
Thatcher, Lucas J. ('05)	Physics	Bluhm, Robert T., Jr.	
Lorentz Violations of Photons in an Axial Gauge			:
Caswell, Annette ('05)	Psychology	Yates, Jennifer R.	
Estrogen Levels in Response to Maternal Stimuli			:
Wheaton, Kelly M. ('05)	Psychology	Yates, Jennifer R.	
Sex Differences in Environment-Dependent Ethanol Tolerance in Rats			:
Annette Caswell ('05)	Psychology	Yates, Jennifer R.	
Gender Differences in Salivary Estradiol and Testosterone Response to Infant Stimuli			:
Kelly Wheaton ('05)	Psychology	Yates, Jennifer R.	
Sex Differences in Environment-Dependent Ethanol Tolerance in C57BL/6 Mice			:

Yeoh, Christopher R. ('05)	Religious Studies	Campbell, Debra	
Moving On-Nostra Aetate and Pope John XXIII			:
Davis, Benjamin M. W. ('05)	Religious Studies	Campbell, Debra	
United Methodism in New England			:
Naik, Nandini A. ('05)	Religious Studies	Singh, Nikky-Guninder K.	
Vipassana Meditation			:
Koh, Clara Z. ('05)	Religious Studies	Marchal, Joseph A.	
The Appropriation of Themes and Symbols from the Book of Joshua in Revelation			:
Emery, Hannah B. ('05)	Sociology	Arendell, Terry J.	
Children's Writing and Popular Culture			:
Hannah Emery ('05)	Sociology / Education and Human Development	Arendell, Terry J.	Smith Room
Popular Culture and the Child Author			April 29

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COLBY CELEBRATION OF SCHOLARSHIP

RESEARCH SYMPOSIUM

Colby Undergraduate Research Symposium 2005

April 27-29, Colby College, Waterville, Maine

Students from the following departments/programs have already submitted titles for papers and posters:

2005 Program

- [Keynote Speaker](#)
- [Schedule - Thursday](#)
- [Schedule - Friday](#)
- [Poster Program](#)
- [Associated Sessions](#)
- [Abstracts](#)
- [Honors Program](#)
- [Participating Departments/Programs](#)

Research Symposium

Sponsoring Dept/Prgrm	Lead Author	Title	Date Time	Project Type	Mentor
American Studies	Emma Lynch ('05)	If You Build it, They Will Come: A History of Changing Notions of Wilderness Along the Appalachian Trail	April 29 9:00 am	Presentation	McFadden, Margaret T.
American Studies	Nathaniel Hulme ('05)	Marriage and Family: A Closer Look into the Debate over Same-Sex Marriage	April 29 9:30 am	Presentation	McFadden, Margaret T.
American Studies	Francis P. Orzechowski	Test Two		Presentation	F. Russell Cole
American Studies	Karinna Russo ('05)	Deceptive Simplicity: A Study of Jacob Lawrence's Migration Series	April 29 10:00 am	Presentation	Margaret T. McFadden
Art	R. Elliott Katz ('05)	Exploration of Structure: Natural Forms in Sculpture and Drawing	April 29 1:30 pm	Presentation	Bevin Engman, Harriett Matthews
Art	Asma Husain ('05)	Exploring Memories and Imagination	April 28 2:30 pm	Presentation	Harriett Matthews
Biology	Patrick J. Slipp ('05)	A Study of Innate Immune Function in Fish of the Androscoggin and Kennebec Rivers	April 29 1:00 pm	Presentation	Lynn Hannum

Biology / Chemistry	<u>Jillian E. Parker</u> ('05)	Analysis of Antimicrobial Peptides in Amphibian Skin Secretions		Poster	Catherine R. Bevier
Biology	<u>Erin Parry</u> ('06)	Characterization of Mercury and Antibiotic Resistance Determinants in Salmonid Gastrointestinal Bacteria		Poster	Frank Fekete
Biology	<u>Julia Morrison</u> ('05)	Conditioned Taste Aversion in Mice (<i>Mus musculus</i>)		Poster	Cathy Bevier
Biology	<u>Eric S. Luth</u> ('05)	Determining the Specific Sites and Patterns of Melatonin Production in the Fiddler Crab, <i>Uca pugilator</i>	April 29 3:00 pm	Presentation	Tilden, Andrea R.
Biology	<u>Dana Gwinn</u> ('05)	Development of DNA Microsatellites for a Tropical Shrub	April 29 3:30 pm	Presentation	Judy Stone
Biology	<u>Noah J. Hoffman</u> ('05)	Development of Microsatellite Markers in <i>Mephitis macroura</i>		Poster	Stacey L. Lance
Biology	<u>Rharaka Gilbert</u> ('05)	Dominance vs. Diversity: Kin Recognition and Female Mate Choice in Zebrafish, <i>Danio rerio</i>		Poster	Catherine R. Bevier
Biology / Environmental Studies	<u>Laura Hudecek</u> ('05)	Effects of Direct and Indirect Cues of Predation Risk on Small Rodent Foraging Behavior		Poster	Stacey Lance
Biology	<u>Jocelyn J. LeBlanc</u> ('05)	Endogenous Rhythmicity of Retinal Photosensitivity in the Fiddler Crab, <i>Uca pugilator</i>.	April 29 2:30 pm	Presentation	Tilden, Andrea R.
Biology	<u>Lydia R. Durant</u> ('05)	Exploring the Ability of Melatonin to Reduce Oxidative Stress in Fiddler Crab Hepatopancreas Cells	April 29 2:00 pm	Presentation	Tilden, Andrea R.
Biology	<u>Carolyn P. Hunt</u> ('05)	Foraging Behavior of the Green Anole Lizard (<i>Anolis carolinensis</i>) after Bursts of Exercise		Poster	Catherine R. Bevier
Biology	<u>Lawrence M. Dagrosa</u> ('05)	Histological Analysis of Leukocyte Populations in Anterior Kidneys of Smallmouth Bass (<i>Micropterus dolomieu</i>) and White Suckers (<i>Catostomus commersoni</i>)		Poster	Lynn Hannum
		Identification of TL-4-			

Biology	<u>Cory Ernst</u> ('05)	Producing Cells in Mutant fsn/fsn Mice by Immunohistochemistry and Confocal Microscopy		Poster	Lynn Hannum
Biology	<u>Maureen M. Sherry</u> ('05)	Overexpression and Purification of the Cereal Grain Proteins TaABF, TaWD40, and AFN1	April 29 4:00 pm	Presentation	Johnson, Russell R.
Biology	<u>Joel G. Morash</u> ('05)	Patterns of Respiratory Burst Activity in Zebrafish	April 29 1:30 pm	Presentation	Lynn Hannum
Biology	<u>Kathryn A. Slemp</u> ('05)	Physiological and Behavioral Effects of Caffeine Ingestion and Voluntary Wheel Running in Female Mice (<i>Mus musculus</i>)		Poster	Bevier, Catherine R.
Biology	<u>Justin A. Guay</u>	Resistance of Soil <i>Bacillus</i> from Different Maine Locations to Mercury and Antibiotics		Poster	Frank A. Fekete
Biology	<u>Natalie A. Wayne</u> ('06)	Sequencing of a cDNA Encoding a Full Length Version of the PKABA1 Interacting Protein TaWD40 and Preparation for Protein Expression		Poster	Russell R. Johnson
Biology	<u>Gillian Butsch</u> ('06)	Territoriality in Male New Zealand Fur Seals (<i>Arctocephalus forsteri</i>) at a Breeding Colony on Otago Peninsula, New Zealand		Poster	Dr. Chris Lalas
Biology / Environmental Studies	<u>Elli Jenkins</u> ('06)	The Preferential Foraging and Habitat Selection Sites of Black-capped Chickadees in the Colby College Perkins Arboretum		Poster	Herb Wilson
Biology	<u>Rharaka R. Gilbert</u> ('05)	The Yellow Bandit: the Identification and Characterization of Coldwater Disease Pathogen		Poster	Frank A. Fekete
Biology	<u>John Mahoney</u> ('05)	The Yellow Bandit: Identification and Characterization of Coldwater Disease Pathogen.		Poster	Frank Fekete
Chemistry	<u>Timothy Newhouse</u> ('05)	Rod-and-Panel Macrocycles	April 28 1:15 pm	Presentation	Thamattoor, Dasan M.
		Stereospecificity of			

Chemistry	<u>Trevor C. Hanly</u> ('07)	the DNA Cross-linking Reaction of Diepoxybutane.		Poster	Julie T. Millard
Chemistry	<u>Michael Feldman</u> ('05)	Synthesis and Characterization of Oxygen-Bridged Multi-Oxacalix[4]arenes		Poster	Katz, Jeffrey L.
Chemistry	<u>Kevin J. Selby</u> ('05)	Synthesis and Characterization of Pyridine-based Bicyclooxacalixarenes		Poster	Katz, Jeffrey L.
Chemistry	<u>John Cole</u> ('05)	The Synthesis of Biomimetic Complexes for Tungsten and Molybdenum Enzymes		Poster	
Computer Science	<u>Noah W. Smith</u> ('05)	Learning Classifier Systems and Evolutionary Robotics		Presentation	Clare Congdon
East Asian Studies	<u>Catherine Fillebrown</u> ('05)	Two Contemporary Representations of Honglou Meng	April 28 4:15 pm	Presentation	Besio, Kimberly A.
East-Asian Studies	<u>Matthew M. Meredith</u> ('06)	Biochemical Research in Japan	April 28 5:00 pm	Presentation	Peter B. Ditmanson
East-Asian Studies	<u>Lena K. Bachmair</u> ('07)	The Colville Collection of Chinese Tomb Art		Poster	Ankeney Weitz
Economics	<u>Caitlin McCusker</u> ('05)	Corporate Social Responsibility in Latin America	April 28 5:00 pm	Presentation	Patrice Franko
Economics	<u>Warner Nickerson</u> ('05)	Determinants of Divorce in China	April 29 2:00 pm	Presentation	
Economics	<u>Emilia Tjernström</u> ('06)	Satan Makes Me Spend My Money ♦ A Study of Street Children's Concept of Money and Economic Behavior, Tangiers, Morocco	April 29 2:30 pm	Presentation	Kashif S. Mansori
Economics / Administrative Science	<u>Matthew Bucklin</u> ('05)	Sources of Market Inefficiency	April 29 1:15 pm	Presentation	Randy Nelson
Economics	<u>Pawel Brodalka</u> ('05)	Strong Nobility, Weak State: An Institutional Analysis Of Poland's Economic And Political Development In The Middle Of The Second Millennium	April 29 1:00 pm	Presentation	Jason M. Long
Economics	<u>Richard Downing</u> ('05)	Determinants of Contractible Sickness in South Africa	April 29 1:30 pm	Presentation	

English	<u>Andrew Orr</u> ('05)	Knowing the Void, Hearing the Sound, and Ordering the Fury: Faulkner's Agency, Through Art, from The Sound and the Fury to Absalom, Absalom!	April 28 1:15 pm	Presentation	Bryant, Cedric Gael
English	<u>Rebecca Nisetich</u> ('05)	Maternal and Cultural Influences on Individual Identity in the Novels of Toni Morrison and William Faulkner	April 28 2:00 pm	Presentation	Bryant, Cedric Gael
English	<u>Sarah Eilefson</u> ('05)	Vietnam: Beyond Tim O'Brien's Literature	April 28 5:30 pm	Presentation	Cedric Gael Bryant
Environmental Studies	<u>Theodore F. McDermott</u> ('06)	2004 Distribution of Brood Trout Stockings For The State of Maine		Poster	Philip Nyhus
Environmental Studies	<u>Wendy A. Sicard</u> ('05)	A GIS Suitability Analysis of Wolf Habitat in Maine		Poster	Philip Nyhus
Environmental Studies	<u>Rob Mehlich</u> ('05)	A Preliminary Habitat Suitability Analysis for the Restoration of South China Tigers in the Hupingshan Reserve, China		Poster	Phillip Nyhus
Environmental Studies / Economics	<u>Stephen A. Kasperski</u> ('05)	A Spatial Comparison of Short and Long Term Migration Trends in China		Poster	, Philip Nyhus
Environmental Studies	<u>William G. Stohner</u> ('05)	Affordable Housing in Kennebec County		Poster	Philip Nyhus
Environmental Studies	<u>Sophie Newbury</u> ('08)	An Analysis of the Maine Coast: Potential Wind Farm Locations?		Poster	Philip Nyhus
Environmental Studies / Geology	<u>Theodore F. McDermott</u> ('06)	Analysis of Future Construction Possibilities on the Colby College Campus		Poster	Philip Nyhus
Environmental Studies	<u>Conor Semler</u> ('05)	Atlas of Maine - Urban Sprawl: Population Migration from 1990-2003		Poster	Philip Nyhus
Environmental Studies	<u>Sophia S. Newbury</u> ('08)	Atlas of Maine: A Map of Impoundments and Their Primary Purpose on Maine Rivers		Poster	
Environmental Studies	<u>Sarah Dunham</u> ('05)	Atlas of Maine: Bedrock		Poster	Philip Nyhus
Environmental Studies	<u>Alexandra Jospe</u> ('06)	Atlas of Maine: Moose-vehicle collisions (MVC) in the State of Maine from 1992-2004.		Poster	Phillip Nyhus
		Atlas of Maine: USGS Topographic Maps			

Environmental Studies	<u>Rob Mehlich</u> ('05)	Topographic Maps over a Hillshaded Digital Elevation Model		Poster	Phillip Nyhus
Environmental Studies	<u>Emily Wilbert</u> ('07)	Average Annual Precipitation in Maine		Poster	Philip Nyhus
Environmental Studies	<u>William G. Stohner</u> ('05)	Changes in Maine's Unemployment Rate		Poster	Philip Nyhus
Environmental Studies	<u>Emily Wilbert</u> ('07)	Detailed Map and Recreational Suitability Assessment of the Colby Trail System		Poster	Philip Nyhus
Environmental Studies	<u>Steve Kasperski</u> ('05)	Educational Assessment of Maine's 11th Graders		Poster	Philip Nyhus
Environmental Studies	<u>Alexandra Jospe</u> ('06)	Estimated Number and Location of Future Moose-vehicle Collisions (MVC) in Maine.		Poster	Phillip Nyhus
Environmental Studies	<u>Sarah Dunham</u> ('05)	Fire Hazard in Coconino County, Arizona		Poster	Philip Nyhus
Environmental Studies	<u>Rich Crowley</u> ('05)	Fish Density in Maine Lakes		Poster	Philip Nyhus
Environmental Studies	<u>Rich Crowley</u> ('05)	Gulf of Mexico's Offshore Oil Platform Wind Potential		Poster	Philip Nyhus
Environmental Studies	<u>Caitlin E. Chamberlin</u> ('05)	Hazard Areas Associated with Major Volcanoes in the Cascade Mountain Range		Poster	Philip Nyhus
Environmental Studies	<u>Wendy Sicard</u> ('05)	Maine Atlas: Wildlife Habitat		Poster	Philip Nyhus
Environmental Studies	<u>Conor Semler</u> ('05)	Money and Education: How Economic Distribution Corresponds to Academic Success		Poster	Philip Nyhus
Environmental Studies	<u>Carolyn P. Hunt</u> ('05)	The Colby College Greenhouse Gas Emissions Audit		Poster	F. Russell Cole
Environmental Studies	<u>Caitlin Chamberlin</u> ('05)	The Relationship Between Watershed Boundaries and Elevation in Maine		Poster	Philip Nyhus
Environmental Studies	<u>Jessica Beetz</u> ('05)	The Role of Private Ownership in the Conservation of Exotic Species	April 29 4:30 pm	Presentation	Nyhus, Philip
Environmental Studies	<u>Brendan Carroll</u> ('05)	The Transboundary Implications of Wolf Reintroduction and Recovery in Maine	April 29 4:00 pm	Presentation	Nyhus, Philip
Environmental Studies	<u>Kevin W. Fritze</u> ('07)	Transportation in Maine		Poster	Philip Nyhus

Environmental Studies	<u>Kevin W. Fritze</u> ('07)	Viewshed Analysis of the Lands of the Belgrade Regional Conservation Alliance		Poster	Philip Nyhus
Environmental Studies	<u>Allison Stewart</u> ('05)	The Forest Service's Quest for Power and Money and its Implications for the American Public	April 29 3:30 pm	Presentation	Fleming, James R.
Geology	<u>Mallory C. Young</u> ('05)	Geological and Historical Investigation of the Belgrade Lakes Watershed		Poster	Bruce F. Rueger
Geology	<u>Gabrielle Adams</u> ('06)	Nitrate and Phosphate Levels in Soil and Water and How They Reflect Previous Crop Growth on a Farm		Poster	Bruce Rueger
Geology	<u>Sarah Dunham</u> ('05)	Rock Detective's Approach to Kaolin for Grades K-12		Poster	Robert Gastaldo, Ruth Deike
Geology	<u>Sam Gray</u> ('05)	Search for the Elusive Permian-Triassic Boundary Laminites of the Karoo Basin, South Africa		Poster	
Geology	<u>Newton W. Krumdieck</u> ('07)	Three-Dimensional Graphitized Plant Fossils from the First Upright Plants on Earth: Trout Valley Formation, North-Central Maine		Poster	Robert E. Nelson
Government	<u>Marc J. Kassin</u> ('05)	Do Presidential Debates Influence Voter Perceptions? National Election Studies Comparisons of Viewers and Nonviewers, 1996 and 2000	April 28 4:00 pm	Presentation	L. Sandy Maisel
Government	<u>Michael Rutherford</u> ('05)	Presidential Management, Fiscal Policy, and Public Rhetoric: An Empirical Investigation of Public Discourse and the Federal Budget	April 28 4:30 pm	Presentation	Maisel, L. Sandy
Government	<u>Pawel Brodalka</u> ('05)	The Political Ethics of Poland's Communist Security Service, Lustration and Wildstein's List.	April 29 3:45 pm	Presentation	L. Sandy Maisel
Government	<u>Timothy Saw Sunshine</u> ('05)	Transitional Justice and Prospect of Reconciliation in Burma	April 28 3:00 pm	Presentation	Ken Rodman
Government / International Studies	<u>Jayadev Vadakkanmarveetil</u> ('06)	Ethnic Cleansing in Burma: How Long, How Many More...	April 28 3:15 pm	Presentation	Prof. Walter F. Hatch

History	<u>Jingjing Zhou</u> ('07)	Recovering My Past-- for Those Who Should Be Remembered	April 28 4:00 pm	Presentation	Peter Ditmanson
History	<u>Aaron Poplack</u> ('05)	Road Rage: The Turnpike Debate In Dedham, Massachusetts, 1801- 1803	April 28 1:30 pm	Presentation	Opal, Jason M.
History	<u>Adam Harvey</u> ('05)	The Maine Supreme Judicial Court and the Battle Over National Identity During the Civil War	April 28 1:00 pm	Presentation	Leonard, Elizabeth D., Opal, Jason
History	<u>Austin Slack</u> ('05)	The Wall Street Journal On Populism (1889-1980)		Presentation	Jason M. Opal
International Studies	<u>Justin Dubois</u> ('05)	Extension of National Membership: Government Promises, Immigrant Expectations and the Impact on the Foreign Population in Germany	April 28 3:00 pm	Presentation	Yoder, Jennifer A.
International Studies	<u>Emily Honig</u> ('05)	Governmental Resistance in International Intellectual Property Rights	April 28 4:00 pm	Presentation	Hatch, Walter F.
International Studies	<u>Erica Hill</u> ('05)	The Liberalization of Village Banking in Guatemala	April 28 3:30 pm	Presentation	Patrice M. Franko
Latin- American Studies	<u>Gabriel Reyes</u> ('05)	The Continuous Struggle for Representation in the Venezuelan State	April 28 1:30 pm	Presentation	Fallow, Ben W.
Mathematics	<u>Seth Pierrepont</u> ('05)	Chaos and Fractals: A Taste of Nonlinear Dynamics		Poster	Jan Holly
Mathematics	<u>Mao Zheng</u> ('06)	Neural Networks for Mathematical Operations	April 28 2:15 pm	Presentation	Jan E. Holly
Mathematics	<u>Julie Jaenicke</u> ('06)	Stretching the Path: Hamiltonian Paths in Graphs	April 29 2:15 pm	Presentation	Tom Berger
Mathematics	<u>Jane Leary</u> ('06)	Women in Mathematics: Ada Lovelace	April 29 2:00 pm	Presentation	Tom Berger
Philosophy	<u>Christopher Surprenant</u> ('05)	Cultivating a Good Will: Moral Progress and the Kantian State	April 29 3:15 pm	Presentation	Calhoun, Cheshire C., Reisert, Joseph
Psychology	<u>Sean Baron</u> ('05)	An Event Related Potential Study of the Role of Attention and	April 28 2:00	Presentation	Joseph Atkins

		Gender in the Illusory Flash Effect	2:00 pm		
Psychology	<u>Annette Caswell</u> ('05)	Gender Differences in Salivary Estradiol and Testosterone Response to Infant Stimuli		Poster	Yates, Jennifer R.
Psychology	<u>Gabe Adams</u> ('06)	Group Deliberation Effects on the Anchoring and Adjustment Heuristic		Poster	Thane Pittman
Psychology	<u>Kelly Wheaton</u> ('05)	Sex Differences in Environment-Dependent Ethanol Tolerance in C57BL/6 Mice		Poster	Yates, Jennifer R.
Psychology	<u>Nicholas Larsen</u> ('05)	Terror Management Theory: Does Sensation Seeking Buffer Against the Effects of Mortality Salience?		Poster	Thane Pittman
Religious Studies	<u>Christopher Rodney Yeoh</u> ('05)	The Religious System of the Australian Aboriginals: A Study of the Arranda People of Central Australia	April 28 1:30 pm	Presentation	Carleen Mandolfo
Sociology / Education and Human Development	<u>Hannah Emery</u> ('05)	Popular Culture and the Child Author	April 29 2:30 pm	Presentation	Arendell, Terry J., Tappan, Mark B.
Sociology	<u>Caroline E. Williams</u> ('07)	The Key Suffix: From Network to Networking; The Evolution of a Study of Waterville's Social Service Agencies	April 29 3:00 pm	Presentation	Thomas J. Morriane

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