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*The Division of Natural Sciences welcomes you to
the 2001 Academic Festival!*

This festival has been a tradition in our division since 1995. It is an occasion to celebrate the accomplishments of the past year as well as a chance for our future scholars to practice communicating their ideas and results—in itself an important opportunity for learning.

This year, students from all seven departments and majors of the Natural Sciences Division will present 68 talks and 77 posters. But the actual presentations are just a part of the festival. The other part is the excitement and enthusiasm you'll no doubt experience as you participate in this process. In short, the academic festival is an occasion for us to reaffirm that we are a community of scholars and scholars-in-training.

We have continued our tradition of a more formalized leadership structure this year and it is run by a committee made up of representatives from all departments and the Environmental Studies program. We thank committee members David Hansen (Biology), Stacia Rink (Chemistry), Tosh Kakar (Computer Science and Computer Engineering), Richard Louie (Physics), Mei Zhu (Mathematics), Jill Whitman, Coordinator (Environmental Studies, Geosciences), Michele Folsom (Computer Systems Administrator), Anita Wahler (Division Administrative Associate) and Sheila Rothstein, Student Assistant.

Please have a feast of the mind, and (at the Saturday pizza lunch) the body!

Chang-li Yiu
Dean of Natural Sciences



Natural Sciences Academic Festival 2001 Schedule

Friday, May 4, 2001

12:00 PM to 2:30 PM.....Poster & Demonstration Check-In, *Rieke Science Center*

12:30 PM to 2:30 PM.....Oral Presentations

2:30 PM to 3:30 PM.....Poster Presentations, Demonstrations, and Break

3:30 PM to 6:00 PM.....Oral Presentations

Saturday, May 5, 2001

8:30 AM to 10:30 AM.....Oral Presentations

10:30 AM to 10:45 AM.....Break

10:45 AM to 12:30 PM.....Oral Presentations

12:30 PM to 1:30 PM.....Picnic, *Rieke Science Center*

1:30 PM to 3:00 PM.....Oral Presentations

3:00 PM to 3:15 PM.....Break

3:15 PM to 5:00 PM.....Oral Presentations

Natural Sciences Academic Festival 2001 Room Schedule

Friday, May 4th		
Time	Room	Department
12:30 PM to 2:30 PM	RCTR – 109	Environmental Studies
	MBLD – 112	CSCE
1:00 PM to 2:30 PM	RCTR – 220	Physics
1:45 PM to 2:30 PM	RCTR – 210	Mathematics
2:30 PM to 3:30 PM	Posters and Demonstrations	
3:00 PM to 5:30 PM	RCTR – 109	Environmental Studies
3:30 PM to 6:00 PM	RCTR – 103 (Leraas)	CSCE
	RCTR – 102	Biology
	RCTR – 122	Biology
	RCTR – 210	Mathematics

Saturday, May 5th		
Time	Room	Department
8:30 AM to 12:30 PM	RCTR – 103 (Leraas)	CSCE
9:30 AM to 12:30 PM	RCTR – 109	Geosciences
10:30 AM to 12:30 PM	RCTR – 102	Biology
	RCTR – 122	Biology
12:30 PM to 1:30 PM	Picnic	
1:30 PM to 5:00 PM	RCTR – 103 (Leraas)	CSCE

Oral Presentation Schedule

Natural Sciences Academic Festival

Oral Presentation Schedule

Friday, May 4th

BIOLOGY

Capstone Presentations..... Rieke 102

Friday, May 4th

Time	Student(s)	Class	Topic
3:30 PM	Megan O'Hanlon	490	Ecological Impact Of The Introduced Species Bufo Marinus In Northern Australia
3:50 PM	Karina I. Helm	490	The Importance Of The Sea Otter, Enhydra Lutris, On Northeastern Pacific Kelp Communities
4:10 PM	Micah Russell	490	Endangered River Dolphins: Their Environmental Threats And Species Conservation
4:30 PM	Stacey Neils	490	Assisted Reproductive Techniques In Endangered Mammals
4:50 PM	William Stewart	490	Cause And Effects Of Whirling Disease
5:10 PM	Jennifer Honigs	490	Through The Eyes Of A Bird: The Workings Of Avian Vision

Capstone Presentations..... Rieke 122

Friday, May 4th

Time	Student(s)	Class	Topic
3:30 PM	Douglas Moore	490	Disease Evolution And Cystic Fibrosis
3:50 PM	Cynthia Geiger	490	Cystic Fibrosis And Lung Transplants
4:10 PM	Derek Hudson	490	The Biocompatibility Of Renal Dialyzers
4:30 PM	Heather Wright	490	End-Stage Renal Disease

Friday, May 4th

Time	Student(s)	Class	Topic
4:50 PM	Jenina Varney	490	Dystrophin And Its Role In Duchenne Muscular Dystrophy
5:10 PM	Jason Kittredge	490	Synaptic Effects Of Acetylcholinestase Inhibitors And Detoxification With Paraoxonase

COMPUTER SCIENCE AND COMPUTER ENGINEERING

Capstone Presentations..... Math Building 112

Friday, May 4th

Time	Student(s)	Class	Topic
1:00 PM	Melissa Hill Justin Lunday Aaron Schrenk	131	A Learning Environment For The New CLT Building
1:15 PM	Isaac Cronk Stephanie Mirie Nika Pelc Laurie Smith	131	Project Mercury
1:30 PM	Chris Bingham Carlos Colon	131	Projectile Motion Apparatus
1:45 PM	Andrea Curtin Tonya Ulufale	490	Real Estate Web Page With Database Search Capability
2:10 PM	Kyle Bowers	490	Bower Power Putt-Putt
2:30 PM	Posters and Demonstrations		

Capstone Presentations..... Rieke 103 (Leraas)

Friday, May 4th

Time	Student(s)	Class	Topic
3:30 PM	Anna Jardine	490	Creating A MUD

Friday, May 4th

Time	Student(s)	Class	Topic
3:55 PM	Leticia Sparkman Thien Tran Tram Vuong	490	Use Of Genetic Algorithm In Breaking Hill Cipher
4:20 PM	James Dumont Matt Jay	490	Swarm Intelligence
4:45 PM	Michael Mallicote Nicholas Steier	490	Evolvable Hardware
5:10 PM	Joseph An Santana Villa	490	A Comparison Of Multi-Tier Architectures For Web-Based Information Systems Under Windows Environment And Linux Computing Environment

ENVIRONMENTAL STUDIES

Capstone Presentations.....Rieke 109

Friday, May 4th

Time	Student(s)	Class	Topic
12:30 PM	Kristin Cannon	490	The Restoration Of Wolves In Yellowstone National Park
1:00 PM	Adam Sundstrom	490	Fresh Water Resources On San Juan Island
1:30 PM	Jenifer Hill	490	Steilacoom Lake: An Environmental Dispute
2:00 PM	Cheyenne Zahrt	490	Voluntary Simplicity
2:30 PM	Break		
3:00 PM	Regis Costello	490	Water Bottle Recycle 2001
3:30 PM	Josh Miller	490	The Effects Of Increasing Visitor Numbers On Mount Rainier National Park And Possible Solutions
4:00 PM	Elissa Broekema	490	The Environmental Impacts Of NAFTA On Mexico

Friday, May 4th

Time	Student(s)	Class	Topic
5:00 PM	Joel Flores	490	The Biological, Political and Spiritual Effects of the Makah Whale Hunt

MATHEMATICS

Capstone Presentations.....Rieke 210

Friday, May 4th

Time	Student(s)	Class	Topic
1:45 PM	TBA	360	TBA
2:05 PM	Emily Yates	360	A Ring Proposal For Emmy Noether
3:30 PM	Marcus Morrell	490	Explorations In Gershgorin Theory
4:30 PM	Jiho Kim	490	Factoring Polynomials Over Z_p Names

PHYSICS

Capstone Presentations.....Rieke 220

Friday, May 4th

Time	Student(s)	Class	Topic
2:00 PM	Josh Thornes	490	Creating And Modeling An Electromagnetic Linear Accelerator
2:15 PM	Brian Stubbs	490	General Relativity And The Precession Of Mercury's Perihelion
2:30 PM	Erik Trask	490	Driven Harmonic Oscillator
2:45 PM	Curtis Dobson	490	Measuring Small Vibrations With Michelson Interferometry
3:00 PM	Stewart Tuvey	490	Propagation Of Electromagnetic Radiation Through The Stellar Interior

Friday, May 4th

Time	Student(s)	Class	Topic
3:15 PM	Tyman Stephens	490	Exploring The Fundamentals Of Aerodynamics, Or, Hacking Up Airplane Wings

*Saturday, May 5th***BIOLOGY**

Capstone Presentations.....Rieke 102

Saturday, May 5th

Time	Student(s)	Class	Topic
10:30 AM	Steven Schwartz		Natural Selection And Speciation In African Cichlids
10:50 AM	Melanie C. Melendez		The Effect Of Green House Gas Emissions And Fixation In Secondary Forest: A Global Concern
11:10 AM	Robyn Nicholson		A Comparison Of Natural Disturbances
11:30 AM	Sandra Carlsson		The Effect Of Snowshoe Hare On Lynx Population Dynamics

Capstone Presentations.....Rieke 122

Saturday, May 5th

Time	Student(s)	Class	Topic
10:30 AM	Ryan Pinney	490	Escherichia coli: Friend Or Foe?
10:50 AM	Keith Pranghofer	490	EBOLA: The Role Of Glycoproteins In Infectious Disease
11:10 AM	Holly Johnson	490	When Stress Makes You Sick: Stress As An Immunomodulator
11:30 AM	Garrett Schroeder	490	The White Plague: New Solutions To An Ancient Scourge

Saturday, May 5th

Time	Student(s)	Class	Topic
11:50 AM	Desirae Marvitz	490	Language Recovery After A Stroke
12:10 PM	Joe Burkley	490	Total Knee Arthroplasty In Humans

COMPUTER SCIENCE AND ENGINEERING

Capstone Presentations..... Rieke 103 (Leraas)

Saturday, May 5th

Time	Student(s)	Class	Topic
8:30 AM	Scott Maynard Greg Pace	490	Internet Ethernet Aggregation
8:55 AM	Anton Bednik Oko Swai	490	Intelligent Power Optimizing Switch (IPOS)
9:20 AM	Nathan Berg	490	Handheld Computer Interface
9:45 AM	Becky Hayden Sheila Rothstein Larinda Stone	490	Mobile Object Sorting Robot (MOSR)
10:10 AM	Break		
10:30 AM	Kristoffer Hedstrom	490	Gjjet - Flight Simulator
10:55 AM	Per Hemminson Evan Shimono	490	Hs3d Modeler
11:20 AM	Joshua Carlson Gerrin Inman	490	Clustering And Parallel Programming
11:45 AM	Gavin Jensen Aaron Rose Micah Sheller	490	Droid Derby
12:30 PM	Picnic		
1:30 PM	Jennifer Leaf Robert Swanson	490	Networking Anything, Anytime, Anywhere!

Saturday, May 5th

Time	Student(s)	Class	Topic
1:55 PM	Carter Smithhart Michael Wendt	490	Odyssey: The Unwritten Space Adventure
2:20 PM	Jiho Kim	490	Object-Oriented Mathematical Manipulations
2:45 PM	Cliff Colon	490	The Jazz Solo Generator
3:10 PM	Hoa Duong Won-Sik Oh	490	PC Wireless Network

GEOSCIENCES

Capstone Presentations.....Rieke 109

Saturday, May 5th

Time	Student(s)	Class	Topic
9:30 AM	Christina K. Knowlton	490	Microbial Responses To Varied Concentrations Of Dissolved Organic Carbon In Groundwater
10:00 AM	Wendy Livezey	490	Putting The Pieces Together: A Geologic History Of The Colorado Plateau
10:30 AM	Break		
11:00 AM	Kristin Nilsen	490	Macropaleontology Of The Doty Hills, Southwestern Washington
11:30 AM	Hazel Wan	490	Changes In Solid Waste Disposal At Landfill No.5 In Fort Lewis And 304 th Street Landfill In Graham, Tacoma Pierce County, Washington
12:00 PM	Antonio Luna	490	Multi-Ringed Meteoric Impact Structure, Origin, And Possible Reasons For Exploration

*Oral Presentation
Submitted
Abstracts*

Natural Sciences Academic Festival
Oral Presentation Submitted Abstracts

BIOLOGY

Sandra Carlsson

The effect snowshoe hare has on Canadian lynx population in terms of functional, numerical, and behavioral responses.

Karina I. Helm

The sea otter, *Enhydra lutris*, has been labeled a 'keystone species' in relation to kelp forest assemblages. This relationship, its possible discrepancies, and the species' overall importance will be explored.

Jennifer Honigs

Birds see the world a lot differently than humans do. A big difference between birds and humans is a bird's ability to see white light and ultraviolet light, where humans can only see color. A bird's eye has adapted features that allow them to be specialized for their needs. Vision is also a very important tool for mate selection, prey detection and other behavioral elements.

Holly Johnson

The human stress response has evolved as a means of coping with life's physical and psychological challenges. However, the response can also be maladaptive. This review attempts to define human stress and discuss the means by which stress becomes sickness. Taking advantage of moderate exercise, optimal nutrition and adequate sleep prove to minimize, if not alleviate stress symptoms.

Jason Kittredge

The synaptic gap is the fundamental pathway by which all central nervous system and neuromuscular junction impulses are transmitted. Any deficiency in this pathway, including hyperstimulation, can have potentially fatal systemic manifestations.

Melanie C. Melendrez

With growing green house gas emissions, concern for global warming continues. Measurements of CO₂ fixation and emission in a secondary forest show a distinct advantage in the preservation of tropical forest ecosystems. The case for this study is the Upper Amazon Basin.

Douglas Moore

Cystic fibrosis is a recessive disease that causes severe lung damage, eventually causing death. Being a recessive disease, why hasn't natural selection itself taken cystic fibrosis out of the gene pool. New theories and medicines are produced everyday to help patients live longer healthier lives. Exciting new gene therapy is closing in on more long-term solutions for patients with this terrible disease.

Stacey Neils

Artificial insemination, in vitro fertilization, embryo transfer, and genome resource banking are discussed in reference to increasing populations of endangered or threatened mammals, primarily in captive situations.

Robyn Nicholson

An analytical comparison of the effects Mount St. Helens, Yellowstone Fires, and Hurricane Hugo have on their ecosystems.

Megan O'Hanlon

An overview of colonization and range expansion of the cane toad in Australia. Evaluation of negative effects on native aquatic predators and discussion of possible biological control methods.

Ryan Pinney

I will discuss both the good and the bad of E. coli, specifically E. coli 0157:H7.

Keith Pranghofer

Due to the extreme physical threats and mystery of the Ebola virus, widespread efforts have been made to better understand the biological and chemical aspects in the hope to create protection from this infectious disease. Through these inquiries it has become clear that central to the lethal actions of Ebola is its transmembrane glycoprotein.

Micah Russell

The endangered river dolphins of China and South America are discussed as they face an increasing probability of their extinction. The environmental problems and current solutions proposed to prevent their extinction are presented.

Garrett Schroeder

Tuberculosis is, without exaggeration, the greatest killer in mankind's history. In the past 7,000 years, societies have feared tuberculosis more than the bubonic plague. Some promising research in vaccine development, as well as drugs targeting bacterial protein secretions making it more accessible to attack are focused on in the presentation.

Steven Schwartz

The mechanisms responsible for the explosive radiation of cichlid fishes in the African Great Lakes remain controversial. According to findings, combined allopatric and sympatric speciation mechanisms have occurred, resulting in the rapid radiation of cichlid species.

William Stewart

Whirling disease is a chronic disease caused by a myxozoan parasite that has been found to have negative effects on rainbow trout populations. The disease involves two hosts (an aquatic worm and a fish) which play crucial roles its distribution.

Heather Wright

The socioeconomic influences and consequences that create large disparities in the relative number of individuals effected with ESRD.

<i>COMPUTER SCIENCE AND COMPUTER ENGINEERING</i>

Joseph An & Santana Villa

Two 3-tier architectures are developed on Windows and Linux environments. The same WIS is implemented on the environments, and models of WISs done using UML will be compared. This provides a clear understanding of 3-tier architecture-based WISs. E-commerce systems are typical examples of the 3-tier architecture.

Anton Bednik & Oko Swai

Energy management and optimization is of high importance from both economical and environmental perspectives. Realizing this, it is vital for recyclable sources like solar energy to go hand in hand with the conventional energy sources in fulfilling the daily energy needs.

Nathan Berg

For my project, I have mapped a keyboard to a new device. This device is held in each hand and also placed on the floor. User input depends on various positions the hands are moved to in mid air. The main goal of this project is to increase the reality of human/computer interactions while playing 1st person games.

Chris Bingham & Carlos Colon

This presentation is designed to study the mechanics of projectile motion by use of a projectile motion apparatus. The apparatus will launch water balloons at set angles, and velocities, to help physics students better understand projectile motion.

Kyle Bowers

A putt-putt golf game written in the Java language.

Joshua Carlson & Gerrin Inman

An exploration into the world of Linux clustering and parallel computing using the Jacobi Iteration.

Isaac Cronk, Stephanie Mirie, Nika Pelc, & Laurie Smith

This project is to design the logic system of a space probe "rover" to be used to explore and take measurements of rock composition, on the planet Mercury. The "rover's" logic system will be designed such that it could potentially be used on the European Space Agency's BepiColombo probe mission to Mercury, in 2009.

Andrea Curtin & Tonya Ulufale

Our project is to create an informational web page for a real estate agent that includes the ability to search, edit and retrieve data from a remote database, along with other useful features.

James Dumont & Matt Jay

Using a neural net to simulate the brains of "bugs" and a genetic algorithm to breed them, our project goal is to examine the trends and traits of swarm intelligence as well as to breed a group of bugs that exhibit swarm behavior.

Becky Hayden, Sheila Rothstein, & Larinda Stone

There is a need to sort objects in industry and even in the household. Come meet Morris, the robot that sorts objects by color and shape.

Kristoffer Hedstrom

This project will describe the development of a three-dimensional flight simulator, glJet. Using a joystick, the keyboard and a mouse the user will be able to fly through a fractal terrain seen from the cockpit of a fighter jet.

Per Hemminson & Evan Shimono

This project is intend to create a graphic utility, which will allow the user to draw, manipulate, import, and save their own rendered 3D objects. Our 3D graphic modeler will also incorporate different object manipulating features, such as rotating, translating, zooming, and scaling.

Melissa Hill, Justin Lunday, & Aaron Schrenk

A new building is going to be built on the PLU campus. This building will house the school of business and the departments of computer science/engineering and mathematics. Our project is to design an environment that brings the Center for Learning and Technology to life.

Anna Jardine & Leticia Sparkman

Today's multiplayer games industry is constantly expanding as nearly all newly released games are designed for multiple players and Internet connectivity. We have developed a basic text-based adventure game, known as a "MUD" which will give us a base on which to expand further into the area of computer game programming

Gavin Jensen, Aaron Rose, & Micah Sheller

Droid Derby is the game we designed in DirectX. It is a 2-dimensional game incorporating 3D technology for added visual effects. Character models for the game were rendered in 3D Studio Max. Game logic was designed and written in C++.

Jiho Kim

Many striking parallels exist between objects (in the computer science sense) and mathematically defined structures such as rings and fields. The talk will cover issues in defining these objects and their interactions.

Jennifer Leaf & Robert Swanson

Jini is a Java-based networking technology that enables robust distributed network services. We will discuss why Jini technology is so useful, describe the basics of a Jini-enabled network, and demonstrate a few Jini services.

Michael Mallicote & Nicholas Steier

We explore the use of genetic algorithms to evolve hardware circuits. Our genetic algorithm generates combinational circuits using software that simulates evolution processes.

Scott Maynard & Greg Pace

This project turns a computer running Linux into an Ethernet router that will allow any computer or network connected to it to simultaneously utilize the incoming and outgoing bandwidth of two unrelated Ethernet based Internet connections.

Carter Smithhart & Michael Wendt

Dynamic Networked 3D Space Simulation game. We are creating a game that will allow us to add modules dynamically while the game is running. Our program is an experiment in designing an extensible game framework.

Thien Tran & Tram Vuong

This project focuses on the use of Genetic Algorithm to find the best key to break the Hill Cipher.

ENVIRONMENTAL STUDIES**Elissa Broekema**

The North American Free Trade Agreement met with opposition by certain groups of environmentalists. However, the environmental impacts of NAFTA on Mexico have been both positive and negative.

Kristin Cannon

Five years after the gray wolf (*Canis lupus*) was reintroduced into the Yellowstone Ecosystem the topic remains controversial as biologists praise the project's success while many local ranchers remain in opposition.

Regis Costello

There are concerns about plastic water bottles, particularly with respect to manufacture. Large amounts of plastic recyclable water bottles in landfills made of PET resin. The proposed policy of manufacture "take-back" is currently being considered.

Joel Flores

The Makah Indians have once again begun whaling for the first time in over 70 years. This has raised questions as to the biological, political and spiritual effects of hunting whales in both the Makah Nation and the international community.

Jenifer Hill

Steilacoom Lake has had problems with algal blooms and aquatic plants. Historically, the lake has been treated with copper sulfate, raising environmental concerns. It is a battle of saving habitat vs. property values.

Josh Miller

The ecosystem of Mount Rainier National Park is being damaged by overuse. Many other parks are experiencing similar problems due to large numbers of visitors. What steps are being taken by Mt. Rainier and other parks to deal with this issue?

Christina Murray

The energy crisis has forced PLU to look at new ways of conserving energy. A newly formed Energy Conservation Task Force has been given the responsibility to draft and implement ideas for conservation on campus.

Adam Sundstrom

Fresh water recharge on San Juan Island is limited to precipitation due to transportation and desalinization costs. The isolation of creates a special need for water resource management to avoid many challenges in the future.

Cheyenne Zahrt

This paper focuses on the historical theological implications of voluntary simplicity. Voluntary simplicity is accepting a new life with fewer possessions. I will include research connecting the environmental problem to the desire to consume more.

GEOSCIENCES**Christina K. Knowlton**

Geological characteristics of bedrock and surficial deposits influence the amount of dissolved organic carbon (DOC) in groundwater. Variations in DOC concentration and effects on microbial respiration and production were evaluated in the laboratory.

Wendy Livezey

The Colorado Plateau consists of Precambrian through Tertiary sediments, metamorphism, and igneous intrusions. During the Cenozoic, the Plateau experienced 2 km of uplift. The most accepted theory to explain the uplift is the delamination model.

Antonio Luna

Multi-Ringed impact structures are amongst the most rare basins found in the solar system. They are however the largest single features of some bodies, and may be a solution to our future mineralogical needs.

Kristin Nilsen

The macrofossils found in the Doty Hills of southwestern Washington show a tropical marine environment during the Eocene. The fossils studied that lead to this conclusion include brachiopods, bivalved molluscs, scaphopods and mostly gastropods.

Hazel Wan

A brief overview of how Landfill No.5 (old) in Fort Lewis and LRI Landfill (new) in Graham changed over the past 20 years. To predict what will change over next 20 years to prevent contamination of Puget Sound from solid waste disposal.

MATHEMATICS

Jiho Kim

Factoring polynomials can be an art. This talk will go through some of the details behind factorization algorithm designed by Elwyn Berlekamp which work on polynomials over integers mod a prime number (Z_p).

Marcus Morrell

Gershgorin's theorem defines a containment region for the eigenvalues of a matrix. We will study this theorem and extensions of it. With this knowledge we will study specific classes of matrices where we can define regions that guarantee the inclusion or the exclusion of eigenvalues.

Emily Yates

Noether strongly jolted the mathematics by her ideas on abstract algebra. Facing a field dominated by males Emmy pursued her passion when confronted with barriers. Many of the barriers that Emmy encountered were not common to her male counter parts.

PHYSICS

Curtis Dobson

A mirror in a Michelson interferometer is attached to a speaker cone, driven by a signal generator. The vibration produces a moving fringe pattern and a periodically varying light intensity on a photodetector. Analysis of the photodetector output determines the frequency and amplitude of the vibration.

Tyman Stephens

Scale-size model airplanes usually fly faster than scale speeds because the more complex aerodynamics of slow flight are less understood than aerodynamics at higher, more practical, speeds. "Slow-speed" principles were used to modify a model airplane so that it would fly at scale speeds.

Brian Stubbs

My project involves using general relativity to account for the observed precession of Mercury's orbit, a problem that was one of GR's first triumphs.

Josh Thornes

An electromagnetic linear accelerator, often called a rail gun, uses the Lorentz force to propel a current carrying projectile. A "table-top" rail gun will be demonstrated, and mathematical models of the electromagnetic fields involved and the Lorentz force will be discussed.

Erik Trask

The goal of this experiment is to understand the relationships between frequency, phase, and amplitude in a driven mass/spring system. Harmonic oscillators are used to model atomic motion and resonance, e.g., the Tacoma Narrows Bridge.

Stewart Tuvey

Within a star, there is a volume outside the core where the primary mechanism for energy transport is electromagnetic radiation. This theoretical investigation shows how the absorption of electromagnetic radiation in a star can be modeled at the atomic level.

*Poster
Presentations
and
Demonstrations*

Natural Sciences Academic Festival

Poster Presentations

Note: An asterisk (*) next to the poster number indicates a tabletop poster. Those without an asterisk are wall posters. Information on Biology poster presentations will be available after the printing of the program.

CHEMISTRY

Poster #	Student(s)	Class	Topic
P1*	Taryn Arnold Jeff Carroll Brandon Faraday	105	Protein Supplementation
P2*	Kristin Baker Renee Clarke	105	Sickle-Cell Anemia
P3*	Anne Benjamins Laney Coyne	105	TBA
P4*	Christy Blackard Heather Gauger	105	Heart Murmurs And Athletes
P5*	Tiffany Budke Molly Christensen Stephanie Pawlawski	105	Human Genome Project
P6*	Megan Ernst Jane Yi	105	How Phytochemicals Benefit Our Health
P7*	Andrea Knowlden Nicole Synder	105	TBA
P8*	Mara Lechner Lisa Morgenthaler	105	Diabetes And Biochemistry
P9*	Amanda Mackey Jennifer Safko	105	Methylmalonic Acidemia
P10*	Chad Mello Walter Owzarski Joe Scheidt	105	TBA

Poster #	Student(s)	Class	Topic
P11*	Rebecka Randall Sofie Tibbling	105	Chemistry Poster
P12*	Julianne Sanford	105	The Ebola Virus
P13*	Rachael Spears Lindsey Wildfang	105	Chemotherapy
P14*	Ryan Warren Kelly Wright	105	Lymph Node Cancer
P15*	Renae A. Z'berg	105	Mad Cow Disease
P16*	Devin Busse	336	Synthesis of Azulene
P17*	Jason Higbee Scott Steward	336	Free Radical Polymerization Of Polystyrene From Ethyl Benzene
P18*	Andrea Westby Melissa Wollan	336	Synthesis Of Bupropion, The Hydrochloride Salt Of (±)-2-(tert-butylamino)-3-chloropropiophenone
P19*	Peter Bonifaci Kirstie Hinson	338	Analysis Of Campus Drinking Water
P20*	Susan Carnine	338	Calcium Determination In A Viactiv Calcium Supplement
P21*	Liz Cox	338	Spectrophotometric Comparison Of Iron Levels In Frozen And Fresh Broccoli
P22*	Kris Harris	338	TBA
P23*	Jennifer Hiatt	338	TBA
P24*	Jacquelyn Kimball	338	TBA
P25*	Carrie Larsen	338	Hydrogen Peroxide Analysis
P26*	Dekey Lhewa	338	TBA
P27*	Anne Rasmussen	338	TBA

Poster #	Student(s)	Class	Topic
P28*	Matthew Geballe	344	The Best Conformer Hunter: Comparing Semi-Empirical Methods On Bisphosphonates
P29*	Jason Higbee Dean Waldow	344	Monte Carlo Simulations Of A Binary Polymer Blend Modified By Varying Copolymers At Low Concentration
P30*	Lia Ossiander	344	Finding The Needle In The Haystack: The Application Of Computational Chemistry In Conformer Searching
P31*	Peter Anderson Brita Willis	405	Isolation Of Cytochrome C
P32	Peter Anderson	435	Use of Mass Spectroscopy for the Identification of Unknown Compounds
P33	Brita Willis	435	Infrared Analysis Of Aldehydes And Ketones: Examination Of The Effect Of Various Substituents And Conjugation On The Carbonyl Absorption Frequencies Of Certain Aldehydes And Ketones
P34	Devin Busse Elizabeth Cox Norman Crites Andrea Haugo Jason Higbee Erica Hunter Jackie Kimball Dekey Lhewa Jessica McFarland Patrick Pastor Sarah Rensel Jeffery Schultz	Club	Investigation Of Western Washington Soil Health By DNA Extraction, Microbial Plating, And UV-Spectroscopy
P36*	Jessica McFarland Lia Ossiander	Intern	Soil Health In Urban Forest Environments: A Comparative Study Of Microbial Diversity And DNA Concentration
P37*	Jacquelyn Kimball Jeffery Schultz		Summer Research: Respiratory-Deficient Yeast Response To Paraquat And Nitrotyrosine

ENVIRONMENTAL STUDIES

Poster #	Student(s)	Class	Topic
P38	Kristin Elizabeth Cannon Lynn Marie Waller	350	Modeling Economic Activity in Clover Creek Watershed
P39	Jon Chesser Renee Rose	350	Land Use Impacts on Clover Creek Watershed
P40	Aaron Henderson Kristin Hovenkotter	350	Water Quality Index and the Health of Clover Creek
P41	Carrie Loe Bill Stewart	350	What Does Geology Say About Stream Health?
P42	Jamie Martin Kim Swanson	350	Clover Creek: A Living System
P43	Kris Russell Nick Sontag	350	Clover Creek Watershed Resources
P44	Becky Summerer Adam Sundtrom	350	Population Influence On Cover Creek Watershed

Environmental Studies 425: Crystal Waters: Environment, Community, and Culture

The influence of environment on community and culture was studied at the Crystal Waters permaculture (sustainable) community in Australia during January 2001. Participants in this study abroad course discovered what it takes to be a cooperating member of a fully integrated intentional biotic community and what it means to "close the loop" on both community and personal levels.

Poster #	Student(s)	Class	Topic
P45*	Jessica Affolter Erin Barzen Katie Benes	425	Rooftop Gardens
P46*	Vanessa Ariens Taryn Arvold	425	Is It Trash?

Poster #	Student(s)	Class	Topic
P47*	Sucia Borneman Becca Ehli Ali Johnson Annie Rolph	425	Ecological Footprint
P48*	Mike Giuliani Jamie Martin Renee Rose Nick Scherdnik	425	Closing The Loop
P49*	Jenifer Hill Adam Sundstrom Cheyanne Zahrt	425	Soil: The Complete Permaculture Principle
P50*	Jessica McFarland	425	Alien Invasion (Cane Toads)
P51*	Emma Sorensen-Jolink	425	Kangaroos at Crystal Waters

HONORS

Poster #	Student(s)	Class	Topic
P52*	Andrea DeLuca	306	Running through the heart
P53*	Jennifer Harsch Andrew Orr	306	Living Upstream
P54*	Nicole Pressman	306	Salmon and the Native American fisherman

MATHEMATICS

Poster #	Student(s)	Class	Topic
P55	Liz Cox Erica Hunter Jackie Kimball	360	TBA
P56*	Matt Jibben Sarita Lockworth	360	What Is With US Ethnocentrism?

Poster #	Student(s)	Class	Topic
P57*	James Sowell Shelby Morris Emily Yates	360	Women In Science Throughout History
P58*	Rena A. Z'Berg	360	Underrepresentation Of Women In Clinical Trials

Demonstrations

<i>COMPUTER SCIENCE AND COMPUTER ENGINEERING</i>

Room	Student(s)	Class	Topic
Foss Field	Chris Bingham Carlos Colon	131	Projectile Motion Apparatus
RCTR-222	Anton Bednik Oko Swai	490	Intelligent Power Optimizing Switch (IPOS)
RCTR-222	Nathan Berg	490	Handheld Computer Interface
RCTR-222	Becky Hayden Sheila Rothstein Larinda Stone	490	Mobile Object Sorting Robot (MOSR)
RCTR-222	Gavin Jensen Aaron Rose Micah Sheller	490	Droid Derby

*Poster Presentation
and Demonstration
Submitted
Abstracts*

Natural Sciences Academic Festival
Poster Presentation and Demonstration Submitted
Abstracts

CHEMISTRY

Taryn Arnold, Jeff Carroll, & Brandon Faraday

We will explain protein synthesis in the human body, how protein is used today as a supplement, and what the body uses protein for. We will also illustrate the structure and properties.

Kristin Baker & Renee Clarke

We will be presenting and defining sickle-cell anemia.

Christy Blackard & Heather Gauger

Our poster presentation will be based off of our written report about heart murmurs and athletes, and how heart murmurs may affect them.

Peter Bonifaci & Kirstie Hinson

Samples of campus drinking water, Lakewood drinking water, and filtered water will be analyzed by ICP for zinc, copper, and iron.

Tiffany Budke, Molly Christensen, & Stephanie Pawlawski

Essential information regarding the Human Genome Project and the advances being made and the pros and cons of them.

Devin Busse

The goal was to synthesize the aromatic, bicyclic compound known as azulene via three relatively simple reactions: synthesis of 6-dimethylaminofulvene, synthesis of 1,1-thiophene dioxide and finally combining these to synthesize azulene.

Devin Busse, Elizabeth Cox, Norman Crites, Andrea Haugo, Jason Higbee, Erica Hunter, Jackie Kimball, Dekey Lhewa, Jessica McFarland, Patrick Pastor, Sarah Rensel, & Jeffery Schultz

The Pacific Lutheran University Chemistry club is conducting a yearlong research study on soil around Western Washington. Eight sites around Tacoma were selected and the soil was analyzed using the methods of DNA extraction, gel-electrophoresis, UV-spectroscopy, and microbial plating.

Susan Carnine

Experiment will determine the percentage of calcium in the common Viactiv calcium supplement.

Liz Cox

This experiment was undertaken to determine if frozen, or processed broccoli, contained similar amounts of iron as fresh broccoli. Samples were made using each sample and

absorbency was measured with a spectrophotometer. The wt % of iron in the food was calculated using these results.

Megan Ernst & Jane Yi

We will be presenting how phytochemicals found in plants improve health.

Matthew Geballe

This work seeks to determine which of three methods, Genetic, Monte Carlo, and Osawa, compare best with systematic approach to conformer hunting using semi-empirical calculations. Time taken, conformers found, and other criteria score methods.

Jason Higbee & Scott Steward

Polystyrene was prepared through a free radical polymerization process. Ethylbenzene under went radical bromination, which then turned into styrene. The styrene was polymerized and characterized through FTIR and GPC.

Jacquelyn Kimball & Jeffery Schultz

Oxidative damage due to reactive oxygen species (ROS) and reactive nitrogen species (RNS) has been linked to a variety of human pathologies. Mitochondrial mutations are often the source of these pathologies. Mitochondrial mutant yeast response to ROS and RNS studied.

Carrie Larsen

Oxidation-reduction titration determination of hydrogen peroxide concentration. In the experiment I will standardize a potassium permanganate solution and then use the stand solution to titrate a commercial hydrogen peroxide solution in order to determine the concentration of H₂O₂.

Mara Lechner & Lisa Morgenthaler

On our poster we will present the relationship between diabetes and biochemistry. We will talk about ketonosis, metabolism, a little bit of the digestive process, and types of diabetes.

Amanda Mackey & Jennifer Safko

Methylmalonic acidemia (MA) is a rare metabolic disorder that has claimed many infants' lives. This poster will describe what MA is, how it is caused, symptoms of the illness, known treatments, prognoses, complications, and case studies.

Jessica McFarland & Lia Ossiander

Soil sampling was conducted at a selected site along Clover Creek in Bresemann Forest. Analysis of samples from the trailside and isolated side of the stream was conducted to measure soil health based on pH, a microbial survey, and DNA quantity.

Lia Ossiander

Optimum search methods for a set of small peptides were determined based on computational time and search success. The Monte Carlo, genetic and Osawa algorithms were compared to the systematic approach with an applied Merck force field.

Julianne Sanford

The purpose of my presentation is to give detailed information, explaining what the Ebola virus is and what it does to our bodies, both chemically and biologically. I also plan to include how it is contracted, where it is found, and the signs and symptoms of the Ebola virus.

Rachael Spears & Lindsey Wildfang

We plan to show how chemotherapy works and the effect it has on its patients. We will display the positive and negative results as well as how chemistry is involved in the treatment.

Ryan Warren & Kelly Wright

Lymph-node cancer is now studied in more detail and specifically at the single sentinel lymph node in comparison to the auxiliary lymph node group as far as their removal. The threat of breast cancer is thought to be solved by the use of radiation and/or a mastectomy. Of these two ways, it is more prevalent to go with the sentinel lymph node dissection over the auxiliary dissection.

Andrea Westby and Melissa Wollan

The synthesis of Bupropion, the hydrochloride salt of (\pm)-2-(t-butyl-amino)-3-chloropropiophenone, was completed in less than two hours through the alkylation of tert-butylamine with a-brominated m-chloropropiophenone in the solvent N-methylpyrrolidinone, a polar aprotic solvent. A hydrochloride salt was then formed using hydrochloric acid in isopropyl alcohol, producing Bupropion in a 45.8% yield.

Rena A. Z'Berg

I will provide information on what Bovine Spongiform Encephalopathy is and how it may effect Washington's livestock. Also, I will provide the current safeguards that the United States is using to prevent Mad Cow disease.

<i>COMPUTER SCIENCE AND COMPUTER ENGINEERING</i>

Chris Bingham & Carlos Colon

This presentation is designed to study the mechanics of projectile motion by use of a projectile motion apparatus. The apparatus will launch water balloons at set angles, and velocities, to help physics students better understand projectile motion.

Anton Bednik & Oko Swai

Energy management and optimization is of high importance from both economical and environmental perspectives. Realizing this, it is vital for recyclable sources like solar energy to go hand in hand with the conventional energy sources in fulfilling the daily energy needs.

Nathan Berg

For my project, I have mapped a keyboard to a new device. This device is held in each hand and also placed on the floor. User input depends on various positions the hands are moved to in mid air. The main goal of this project is to increase the reality of human/computer interactions while playing first person games.

Becky Hayden, Sheila Rothstein, & Larinda Stone

There is a need to sort objects in industry and even in the household. Come meet Morris, the robot that sorts objects by color and shape.

Gavin Jensen, Aaron Rose, & Micah Sheller

Droid Derby is the game we designed in DirectX. It is a 2-dimensional game incorporating 3D technology for added visual effects. Character models for the game were rendered in 3D Studio Max. Game logic was designed and written in C++.

ENVIRONMENTAL STUDIES**Kristin Elizabeth Cannon & Lynn Marie Waller**

Developing an economic profile is a vital indicator of the health of the Clover Creek Watershed. Analysis suggests that there is a direct correlation between economic activity and stream health.

Jon Chesser & Renee Rose

Land use in Clover Creek Watershed has changed in recent years and has led to the degradation of water quality in Clover Creek. Current land use in Clover Creek Watershed includes commercial, residential, agricultural, and military bases.

Aaron Henderson & Kristin Hovenkotter

Water quality analysis can give a very good idea of overall stream and watershed health. A Water Quality Index allows for comparison to state standards; the results from Clover Creek show it to be healthy.

Carrie Loe & Bill Stewart

When focusing on the geology of the Clover Creek watershed gradient, turbidity, discharge, velocity, and grain size were analyzed to provide quality indicators of stream health. The results demonstrate differences in data over past years.

Jamie Martin & Kim Swanson

Clover Creek is a complex biological system. Human impact on the watershed influences levels of dissolved oxygen and biological oxygen demand, ultimately affecting the life of the stream.

Kris Russell and Nick Sontag

Clover Creek is a watershed of resources- sustaining wildlife, nurturing plants, and feeding an underground aquifer. These resources support the plant, animal, and human residents of the watershed basin.

Becky Summerer & Adam Sundtrom

Human population is an important assessment of a watershed. The Clover Creek watershed population is increasing. Therefore growth management is critical to sustaining a healthy community.

HONORS

Andrea DeLuca

This poster will deal with Salmon and self-restraint, specifically what it means to demonstrate an ethical and moral standpoint on the depletion of Salmon in the Pacific Northwest.

Jennifer Harsch & Andrew Orr

The poster will deal with the effects of people on riparian zones and river quality, and how people's lack of self-restraint in regard to rivers have harmed salmon runs.

Nicole Pressman

The poster topic will concern the virtue of self-restraint, in regards to Native American fisherman, and in our society in general. This topic will be dealt with on 3 levels: economically, environmentally, and interpersonal relationships.

MATHEMATICS

Matt Jibben, Sarita Lockworth, & James Sowell

This project should show how small we are here in Tacoma or even the USA, when you can make a circle with half the world's population centered on the southern border of China.

Shelby Morris & Emily Yates

This poster is a brief overview of women throughout history who have influenced science in some way. It is to help make known those who have not been recognized for their achievements and contributions.

Renae A. Z'Berg

Women are continuously underrepresented in clinical trials with regard to heart disease and cancer. I will explore why this underrepresentation is occurring and what it means to women and their health.