

**Midstates Consortium for Math and Science
Undergraduate Research Symposium
Physical Sciences, Mathematics, and Computer Science
The University of Chicago
October 25-26, 2013**

Program Schedule

Friday, October 25

5:30 – 6:30 pm	Registration	Holiday Inn Ballroom
6:00 pm – 7:30 pm	Dinner buffet	Holiday Inn Ballroom
7:30 – 7:45 pm	Welcome	Holiday Inn Ballroom

Michael Stein, Symposium Organizer
The University of Chicago
&
Brandy Russell, Director
Midstates Consortium for Math and Science
Gustavus Adolphus College

7:45 – 8:45 pm	Janet Anderson Award Lecture	Holiday Inn Ballroom
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Brad Chamberlain
Associate Professor
Department of Chemistry
Luther College
“Satan’s Resin? Redeeming Plastic in a Disposable Age”

8:45 – 9:15 pm	Keynote Lecture	Holiday Inn Ballroom
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Michael Stein
Ralph and Mary Otis Professor
Statistics Department
The University of Chicago
“Statistics in the Physical Sciences”

Saturday, October 25

7:30 am

Depart for University of Chicago Campus

Holiday Inn Lobby

Those with vans or cars will drive to campus. Others will take a shared bus.

8:00 – 9:00 am

Breakfast Buffet

**2nd Floor Common Room
Kersten Building**

9:00 – 10:00 am

Oral Presentations of Student Papers

Session A: Computer Science, Mathematics, Statistics

Session B: Chemistry

Session C: Physics and Chemistry

Kersten Building

Room 105

Room 120

Room 103

10:00 – 10:15 am

Break and Group Picture

(Poster Session 1 set-up)

Meet on 1st floor

10:15 -11:00 am

Oral Presentation Sessions A, B, and C, continued

Same rooms

11:00 – 12:00 pm

Poster Presentations

Session 1

1st, 2nd, 3rd floor

12:00 – 12:45 pm

Lunch Buffet

2nd floor common room

12:45 – 1:30 pm

Parallel Panel Sessions

Graduate School Information

Careers at Liberal Arts Colleges

Room 120

Room 103

1:30 – 2:30 pm

Oral Presentations of Student Papers

Session D: Astrophysics and Astronomy

Session E: Biochemistry and Biophysics

Session F: Environmental Science and Chemistry

Room 103

Room 120

Room 105

2:30 – 2:45 pm

Break

(Poster Session 2 set-up)

2:45 – 3:30 pm

Oral Presentation Sessions D, E, and F, continued

Same rooms

3:30 – 4:30 pm

Poster Presentations

Session 2

1st, 2nd, 3rd floor

4:30 – 4:45 pm

Concluding Remarks

Complete evaluations

Boxed dinners to go

2nd floor common room

5:00 pm

Meeting Concludes

Bus leaves for O'Hare Airport

Bus leaves for Holiday Inn

ORAL SESSION A – Saturday, 9:00am

Kersten Building, Room 105

# of Presenter	Presenter Name	College / University	Title of Presentation
A.1 (9:00)	Elizabeth Levy	Beloit College	Comparing Garbage Collection in Python and Java
A.2 (9:15)	Ravi Donepudi	Colorado College	Asymptotics of Cubic Function Field Extensions with Given Quadratic Resolvent
A.3 (9:30)	David McMorris	Hope College	Identifying transitions in bean beetle maturation using modified wavelet methods
A.4 (9:45)	Weston Ungemach	University of Chicago	A Better Bound on the Size of Isospectral Families
BREAK 10:00-10:15am			
A.5 (10:15)	Jenny Rustad	Luther College	Dynamics of Negatively-Refracted Light in Tilings
A.6 (10:30)	Nediyana Daskalova, Ann Hu, Kyle Moorehead, Benjamin Wagnon	Grinnell College	Participatory Design of Technology to Improve Sleep Habits

ORAL SESSION B – Saturday, 9:00am

Kersten Building, Room 120

# of Presenter	Presenter Name	College / University	Title of Presentation
B.1 (9:00)	Daria Grishina	Gustavus Adolphus College	Towards a novel switchable aromatic hemiporphyrzine
B.2 (9:15)	Alison Bayly	Grinnell College	The Synthesis of α -Chloro and α -Bromo Chalcones
B.3 (9:30)	Ryan Witzke	University of Chicago	Chemistry of Nickel (I) N-Heterocyclic Carbene Complexes
B.4 (9:45)	Tabbatha Bohac	University of Chicago	Towards the Synthesis of a Multi-Metallic Polymerization Catalyst
BREAK 10:00-10:15am			
B.5 (10:15)	Jennifer Fulton	Grinnell College	Synthesis and Utility of Thiol Phosphonamidates
B.6 (10:30)	Naomi Clayman	University of Chicago	Synthesis of a Pd(II) catalyst for insertion copolymerization of ethylene and polar comonomers
B.7 (10:45)	Natalie Nicholls	Colorado College	Synthesis of a Novel Compound for the Treatment of Human African Trypanosomiasis

ORAL SESSION C – Saturday 9:00 am

Kersten Building, Room 103

# of Presenter	Presenter Name	College / University	Title of Presentation
C.1 (9:00)	Evangelos Vlachos	Grinnell College	Structural and Magnetization Analysis of DyCrSb ₃
C.2 (9:15)	Tim Ellis-Caleo	Washington University in St. Louis	Effects of NaOH in Solid NaH: Solution/Segregation Phase Transition
C.3 (9:30)	Amber Betzold, Ashley Coenen, Daniel Thoresen	Lawrence University	Semi-Automated Microtubule Tracking for More Precise Measurements
C.4 (9:45)	Dylan Winston	Luther College	Spin Torque in π and 2π metal domain walls
BREAK 10:00 – 10:15 am			
C.5 (10:15)	Eric Hanson	Gustavus Adolphus College	Wireless Power Transfer
C.6 (10:30)	Erin Gauger	Washington University in St. Louis	NMR Studies of Oil Shale
C.7 (10:45)	Will Doeblner & Joshua Wolanyk	Gustavus Adolphus College	Implementation of a Time of Flight Mass Spectrometer Utilizing a Linear Quadrupole Paul Ion Trap

ORAL SESSION D – Saturday 1:30pm

Kersten Building, Room 103

# of Presenter	Presenter Name	College / University	Title of Presentation
D.1 (1:30)	Quincy Flint	Gustavus Adolphus College	Seven Missing Years: Filling the Final Gap with MLSO MK3
D.2 (1:45)	Jane Huang	University of Chicago	Fitting Diffuse Interstellar Band Profiles
D.3 (2:00)	Alexander Lanzano	University of Chicago	The Influence of Solar Radiation on Mercury's Exosphere
D.4 (2:15)	Clifford Watkins	St. Olaf College	Lunar Cold Spots: Characterization and Possible Formation Mechanisms
BREAK 2:30 – 2:45pm			
D.5 (2:45)	Tanner Rasmussen	Lawrence University	The Effects of Mass Infall on Protoplanetary Disks
D.6 (3:00)	Savanna Thais	University of Chicago	ATLAS Dark Matter + Heavy Quark Search
D.7 (3:15)	Brycen Kryzer	St. Olaf College	The Physics of Necking

ORAL SESSION E – Saturday 1:30pm

Kersten Building, Room 120

# of Presenter	Presenter Name	College / University	Title of Presentation
E.1 (1:30)	Richard Wickersham	Washington University in St. Louis	DISCRIMINATE: A systematic, iterative methodology for isoform-specific drug design
E.2 (1:45)	Sukrit Singh	Washington University in St. Louis	Synthesis of Amide Bond Nitroxide for Determination of Intermolecular Distances in HIV Initiation
E.3 (2:00)	Devon Eastlack	University of Chicago	Development of Hydrogel Arrays for the Optimization of Biochemical Cues for Cell Attachment and Migration
E.4 (2:15)	Michael Paul	University of Chicago	Shape-Variable Nanoelectronics for Studying Cellular Dynamics
BREAK 2:30 – 2:45pm			
E.5 (2:45)	Alejandro Scaffa	Grinnell College	Elucidating the Allosteric Binding Sites of Nicotinic Acetylcholine Receptors with Liquid Chromatography Mass Spectrometry
E.6 (3:00)	Alexander Greiner	Luther College	Controlling a Gene Promoter by Placement in a DNA Loop
E.7 (3:15)	Elizabeth Phelan	Grinnell College	Gas-phase hydrogen-deuterium exchange of protonated histidine and histidine dipeptides

ORAL SESSION F – Saturday 1:30pm

Kersten Building, Room 105

# of Presenter	Presenter Name	College / University	Title of Presentation
F.1 (1:30)	Tim Bumpus, Grace Gast, & Jenna Huju	Luther College	Determining Host-Guest Interactions of Common Environmental Pollutants via Fluorescence Spectroscopy
F.2 (1:45)	Anna Huff	Gustavus Adolphus College	Characterization of Ni(II)-Pyrazole Complexes
F.3 (2:00)	Yijun Liao	Hope College	Presence and Absence of Halogenated Flame Retardants in Polyurethane Automotive Seating Foams
F.4 (2:15)	Hannah Kim	Colorado College	Solving the time independent Schrödinger's equation for chemical systems: examining necessary approximations using limited computing speed
BREAK 2:30 – 2:45pm			
F.5 (2:45)	Evan Rugen	Hope College	The Growth Mechanism of Bi ₂ Te ₃ by Polyol Synthesis
F.6 (3:00)	Emma Koenig	Beloit College	Synthesis of Oriented ZnO Nanostructures and their Environmental Applications to Photoelectrochemistry and Photoremediation
F.7 (3:15)	Christopher Beaudoin	Hope College	Thin Film Characterization

Poster Session 1: 11:00 am – 12:00 pm

Poster Number	Presenter's Name	Presenter's College or University	Presentation Title
P1.01	Cullen McDonald	Beloit College	Curvature homogeneity of type (1, 3) in pseudo-Riemannian manifolds
P1.02	Lingzhi Meng	Beloit College	Time Series Forecasting with Wavelets
P1.03	Mark Flanigan	Carthage College	An NMR Investigation of the Effect of pH on the Aggregation of Amino Acid Surfactants
P1.04	Kangmin Kim	Colorado College	Synthesis of a Novel Compound for the Treatment of Human African Trypanosomiasis
P1.05	Swetha Charles	Colorado College	Microwave assisted synthesis of the Quinoline motif via multicomponent reactions
P1.06	Christi Peterson	Grinnell College	Nanoparticle Catalysts for the Transformation of Biofuel Precursors
P1.07	Emily Groth	Grinnell College	Structural and Physical Properties of the Rare Earth Intermetallic TbCrSb ₃
P1.08	Keaton Cameron-Burr	Grinnell College	Effects of Dissolved Organic Matter Character on Mercury Bioavailability
P1.09	Steven Petritis	Grinnell College	Synthetic Studies Towards Tabersonine-Type Aspidosperma Alkaloids
P1.10	Zachary Angel	Grinnell College	Synthetic Studies towards 3 α -acetyl-19-hydroxytabersonine
P1.11	Danielle Mangine	Gustavus Adolphus College	Diels-Alder reactions of prochiral 1,5-disubstituted anthracenes towards the creation of chiral auxiliaries and ligands
P1.12	Amber Prins	Hope College	How (not?) to make diaminoacenaphthylene for use in preparing carbonyl-substituted photochromes
P1.13	Cameron Holder	Hope College	Determining the Growth Mechanism of Thermoelectric PbTe Nanoparticles by Polyol Process
P1.14	Julia Slopsema	Hope College	Feasibility of Surface Stimulation to Alleviate Phantom Limb Pain
P1.15	Matthew Gira	Hope College	Area and Capacitance Characterization of Nickel, Cobalt, and Nickel-Cobalt Electrodeposited Thin Films
P1.16	Thomas Smeltzer	Hope College	The Preparation and Characterization of Diketopyrrolopyrrole Functionalized PEDOT Films
P1.17	Mike Supej	Knox College	Synthesis and characterization of new iron dibromide complexes for the hydrosilation of 1-hexene.
P1.18	Oluwagbemiga A. Ojo	Knox College	Investigation of Ligand Substitution Reaction of Copper (II) tetrakis(diphenyl)acetate
P1.19	Ben Anderson	Luther College	Search for Period Variability in Eclipsing Binary Stars

Poster Number	Presenter's Name	Presenter's College or University	Presentation Title
P1.20	David Pfothenauer	Luther College	Stability of Variability in Long-Period Variable Stars in the Field of Open Star Cluster M23
P1.21	Gian Andreone	Luther College	Investigating single electron capture between water molecules and bare ions
P1.22	Megan Gelsinger	Luther College	B-Cell Chronic Lymphocytic Leukemia - A Model with Immune Response of Genetically Modified Anti-CD19 CAR T-Cells
P1.23	Andrew Olinger	Macalester College	Quantum Mechanical Simulations of Modifications to Alkene Ozonolysis with Nitrogenous Adducts
P1.24	Minh Nguyen	Macalester College	Holographic Technicolor and approximately conformal symmetry in quantum mechanics
P1.25	Nathanael Cox	Saint Olaf College	Maximum Number of Arcs on a Digraph for a given zero forcing number
P1.26	Charles Liggett	St. Olaf College	Novel SPE Materials With Highly Ordered Hybrid Nanostructured Architectures for Lithium Ion Batteries
P1.27	Owen Puls	St. Olaf College	How Systems Change: Characterizing the Rigidity Transition for a Triangular Lattice of Connected Springs
P1.28	Charlie Tapio	St. Olaf College	Survey of first-row transition metal complexes using a novel hybrid ligand
P1.29	Derek Wong	University of Chicago	Incorporating an Apoptotic Peptide into Complex Coacervate Core Micelles
P1.30	Isaac Larkin	University of Chicago	Characterization of a Putative Carbon Monoxide Oxidase in <i>Caulobacter Crescentus</i>
P1.31	Taha Ezzyat	University of Chicago	Applications of Solution Processed CdTe in Thin Film Photovoltaic Devices
P1.32	Harison Wiesman	Washington University in St. Louis	The Stardust Interstellar Dust Collector Crater Origins and Hypervelocity Cratering in Aluminum Foil
P1.33	Tansel Baran Yasar	Washington University in St. Louis	Estimation of the presynaptic spike trains by the analysis of single membrane potential traces

Poster Session 2: 3:30 – 4:30 pm

Poster Number	Presenter's Name	Presenter's College or University	Presentation Title
P2.01	Laramie Wieseman	Beloit College	Using urea as a probe for conformational changes during enzyme catalytic mechanisms
P2.02	Ashley Gladis	Carthage College	An Investigation of β -Blocker Association with Chiral Molecular Micelles by means of Molecular Dynamics Simulations
P2.03	Victoria Northrup	Carthage College	An Investigation of Chiral Amino Acid Micelles by Means of NMR Spectroscopy
P2.04	Matthew Dickinson	Colorado College	Synthesis of Precursor to CF2H Tebuquine and Amodiaquine Analogs
P2.05	Trevor Barron	Colorado College	Neural Networks and Word Decomposition for Natural Language Processing
P2.06	Elena Jaffer	Grinnell College	Effect of Fe(II) on Microbial MeHg Production in Hg-S-DOM Solutions
P2.07	Katherine Schlasner	Grinnell College	pH-dependent Studies of the Glu28Gln E. coli Methylenetetrahydrofolate Reductase: Reductive Half-Reaction
P2.08	Michael Korte	Grinnell College	Development of Interdisciplinary Project-Based Spectroscopy Laboratories for Physical Chemistry
P2.09	Teodora Kljaic	Grinnell College	Does the β 2 C loop of the neuronal nicotinic acetylcholine receptor dictate the type of allosteric modulation?
P2.10	Amy Christiansen & Alexa Peterson	Gustavus Adolphus College	Photodegradation of Three Imidazolinone Herbicides: Imazapic, Imazamox, and Imazaquin
P2.11	Kacy Lorber	Gustavus Adolphus College	Metal complexes of 1,3-bis(imidazolyl-2'-imino)isoindoline, a novel tridentate multivalent ligand
P2.12	Brian Mulhern	Hope College	Synthesis of TetraEDOT-Porphyrins as Redox Mediators for Biological Sensing Applications
P2.13	Christopher Davis	Hope College	Single-Molecule Fluorescence Spectroscopy at Hope College
P2.14	Lauren Messer	Hope College	Toward a trifluoromethyl-substituted quinazolinespirohexadienone photochromes for gating PICT
P2.15	Minchul Kim	Hope College	Ruthenium-Poly(Vinyl Pyridine) (RuPVP) Metallopolymers for Catalyzing Self-Oscillating Gels
P2.16	Brad Musselman	Knox College	Examination of the structure function relationship of heteroleptic dimeric copper(II) metallomesogens utilizing the tetrakis(phenylacetate)dicopper(II) precursor

Poster Number	Presenter's Name	Presenter's College or University	Presentation Title
P2.17	Mike Sprinkle	Knox College	Synthesis and Characterization of mono- and bis- substituted tetrakis(m-toluate)dicopper(II) paddlewheel dimers
P2.18	Daniel Martinez Zambrano	Lawrence University	Surface reconstruction in crystalline-B liquid crystal films
P2.19	Grant Barnes	Luther College	Finding the Catalan Numbers in the One-dimensional Sandpile Model
P2.20	Cadence Sawyer	Luther College	Predicting Avalanche Sizes in the One-Dimensional Sandpile Model
P2.21	Erik Linn-Molin & Steven Sorenson	Luther College	Frictional Modification of Aluminum Oxide Surfaces
P2.22	Joseph Novak	Luther College	Searching for Brief Transient Events in Stellar Signals
P2.23	Jesse Cutter	Macalester College	Applications of Bis(trimethylsilyl)acetylene in 1,2,3-Triazole Synthesis: Exploring Scope
P2.24	Francis Gwandu	Macalester College	Applications of Bis(trimethylsilyl)acetylene in 1,2,3-Triazole Synthesis: Protocol Optimization
P2.25	Grace Putka	Macalester College	Group VI Metal Carbonyl Complexes of Bis(diphenylphosphinomethyl)diphenylborate
P2.26	Sara Staszak	Macalester College	Anomaly Detection Using Dictionary Learning
P2.27	Devin Ferguson	St. Olaf College	Palladium Catalyzed C-H Arylation Using Mesylates as Electrophiles
P2.28	Nate Hillson	St. Olaf College	Dynamic Control of a Low-Cost Robotic Arm
P2.29	Ryan Menssen	St. Olaf College	L-Proline Destabilization of RNA Duplexes is Temperature Dependent
P2.30	Eitamar Nadler	University of Chicago	Encapsulation of Proteins in Coacervates in Varying Solution
P2.31	Shaunae Alex	University of Chicago	Nutrient regeneration and enzymatic activity following cell lysis in aquatic microbial ecosystems
P2.32	Adam Slavney	Washington University in St. Louis	Synthesis and Reactions of Azapentadienyl-Ruthenium Compounds
P2.33	Ken Tharp	Washington University in St. Louis	Exploring the TiMn ₂ Hydride Equilibrium
P2.34	Yu Tao Li	Washington University in St. Louis	Characterizing the Diffraction Pattern of Ultrasonic Fields Employed in Studies of Osteoporotic Cancellous Bone