THE SIGNIFICANCE OF CUL3-TARGETED CRISPR/Cas9 KNOCKOUT ON HUMAN COLORECTAL CANCER
Zoe Lautz and Jodi Goldberg (Advisor)
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CHARACTERIZATION OF CP43 AND PIF1 GENES IN *Medicago truncatula*
Nathan Henning and Betsy Martinez-Vaz (Advisor)
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THE MICROBIAL BURDEN ON COMMON HOSPITAL SURFACES: A PILOT STUDY IN PREPARATION FOR THE SURFACES TO BE REPLACED BY ANTIMICROBIAL COPPER
Miranda Chimzar and Betsy Martinez-Vaz (Advisor)
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REPEATED CHALLENGE WITH THE CONTACT ALLERGEN OXAZOLONE PROVOKES REGULATORY AND RESIDENT MEMORY T CELL ACCUMULATION IN THE LABIAR SKIN OF PREVIOUSLY SENSITIZED ND4 MICE
Charlie Benck and Devavani Chatterjea (Advisor)
Department of Biology
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CYCLOMETALLATED PALLADIUM(II) COMPLEXES WITH FLUXIONAL THIACROWN LIGANDS
Meaghan Bruening and Daron E. Janzen (Advisor)
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St. Catherine University, St. Paul, MN

STUDYING INSECT DIVERSITY, ABUNDANCE, AND TROPHIC COMPLEXITY IN RECONSTRUCTED GRASSLAND HABITATS NEAR AUSTIN, MINNESOTA
Chad Cyboran and Jeff Port (Advisor)
Department of Biology
Bethel University, St. Paul, MN

THOMAS B. MAGATH AWARD FOR EXCELLENCE IN CELLULAR AND MOLECULAR BIOLOGY

RESPONDIN-2 GENE KNOCKOUT IN HUMAN COLORECTAL CANCER UTILIZING CRISPR/Cas9
Jennifer Scalze and Jodi Goldberg (Advisor)
Department of Biology
Hamline University, St. Paul, MN
Mycobacteriophage QuinnKiroE1 DISCOVERY AND GENOMICS
Isaac Wakiro, Daniel Westholm (Advisor), and Kara Thoemke (Advisor)
Department of Biology
The College of St. Scholastica, Duluth, MN

STATUS OF THYLAKOID PROTEIN PHOSPHORYLATION IN SUMMER-STATE CONIFERS VS. WINTER-STRESSED CONIFERS IN VARYING GROWTH LIGHT ENVIRONMENTS
Jacob Jerrard and Amy Verhoeven (Advisor)
Department of Biology
University of St. Thomas, St. Paul, MN

THE IMPACT OF HIGH CONCENTRATIONS OF ESSENTIAL HEAVY METALS ON THE GENE EXPRESSION OF THREE TonB-DEPENDENT RECEPTORS IN Caulobacter crescentus
Dylan Leonard, Miles Smith, and Lisa Bowers (Advisor)
Department of Biology
St. Olaf College, Northfield, MN

UTILIZING MTS TO VERIFY THE CRISPR/Cas 9 TRANSFECTION IN DRIVER GENES OF COLORECTAL CANCER
Fathima Mohamed, Maija Jedynak, and Jodi Goldberg (Advisor)
Department of Biology
Hamline University, St. Paul, MN

LEE I. SMITH AWARD FOR EXCELLENCE IN CHEMISTRY

ATOMISTIC INTERPRETATIONS OF OPTICAL ACTIVITY
Sarah N. Elliott and Rollin A. King
Department of Chemistry
Bethel University, St Paul, MN

MECHANISTIC INSIGHTS INTO THE ZUMACH-WEISS-KÜHLE SYNTHESIS OF DITHIASUCCINOYL (Dts)-PROTECTED AMINES
Matthew Henley and George Barany (Advisor)
Department of Chemistry
University of Minnesota–Twin Cities, Minneapolis, MN

SYNTHESIS AND CRYSTAL STRUCTURE OF Pb$_{8-x}$Na$_2$REE$_x$(VO$_4$)$_6$O$_{12}$
Estelle Tachago, Brontae Berkhoel, and Lyudmyla Stackpool (Advisor)
Chemistry and Geology Department
Minnesota State University–Mankato, Mankato, MN

NEWTON H. WINCHELL AWARD FOR EXCELLENCE IN EARTH SCIENCE

SEDIMENTOLOGIC APPLICATION OF SETTLING TUBE DATA
Michael Reeves and Tim Kroeger (Advisor)
Department of Geology
Bemidji State University, Bemidji, MN
ARThUR N. WILCOX AWard FOR EXCELLENCE IN ECOLOGY AND ENVIRONMENTAL SCIENCE

ABILITY OF Pteromalus WASPS TO PARASITIZE Papilo polyxenes
Lauren Henrich and Karen Oberhauser (Advisor)
Department of Ecology, Evolution, and Behavior
University of Minnesota–Twin Cities, St. Paul, MN

RESPONSES TO pH STRESS IN Sinorhizobium STRAINS: A PRELIMINARY STUDY
Ashley Steevens and Betsy Martinez-Vaz (Advisor)
Department of Biology
Hamline University, St. Paul, MN

THE EFFECTS OF VARYING RATES OF NITROGEN FERTILIZER AND NITRIFICATION INHIBITOR ON SOIL NUTRIENTS, YIELD, AND PROFIT IN SOUTHEASTERN MINNESOTA CORNFIELDS
Kate Seybold and Kathleen Shea (Advisor)
Department of Biology
St. Olaf College, Northfield, MN

CURTIS D. MotchEnbacher Award FOR EXCELLENCE IN ENGINEERING

MODELING FLOW RATES AND OPTIMIZING THE REACTION BETWEEN SODIUM BOROHYDRIDE AND ETHYLENE GLYCOL FOR USE IN A PORTABLE FUEL CELL
Brent Vizanko\textsuperscript{1} and Steven Sternberg\textsuperscript{2} (Advisor)
\textsuperscript{1}Department of Chemical Engineering, University of Minnesota–Twin Cities, Minneapolis, MN
\textsuperscript{2}Department of Chemical Engineering, University of Minnesota–Duluth, Duluth, MN

FRANK R. VERBRUGGE Award FOR EXCELLENCE IN MATH AND COMPUTER SCIENCE

PURSUING THE SADDLE POINT: SOCIAL SCIENCES VS. NATURAL SCIENCES
Gilbert Penaherrera and Derek Webb (Advisor)
Department of Mathematics and Computer Science
Bemidji State University, Bemidji, MN

EDWARD J. BALDES Award FOR EXCELLENCE IN NEUROSCIENCE

EFFECT OF MICROGLIAL ACTIVATION ON SCA1 PATHOLOGY
Daniel Svedberg and Marija Cvetanovic (Advisor)
Department of Neuroscience
University of Minnesota–Twin Cities, Minneapolis, MN

EXPRESSION AND PURIFICATION OF THE FUNCTIONAL SILICA-BINDING PROTEIN FUSED WITH RGD MOTIF FOR NEURAL TISSUE ENGINEERING
Amien Masroujeh, Asma Adam, Anna Augustine, Jordan Bruss, and Mong-Lin Yang (Advisor)
Department of Biology
Concordia University St. Paul, St. Paul, MN
HIRAM E. ESSEX AWARD FOR EXCELLENCE IN ORGANISMAL AND PHYSIOLOGICAL SCIENCES

MATRIX METALLOPROTEASE EXPRESSION IN THE IRON-DEFICIENT NEONATAL RAT BRAIN
Carl Anderson and Grant Anderson (Advisor)
Department of Chemistry and Biochemistry
University of Minnesota–Duluth, Duluth, MN

MERCURY DISTRIBUTION IN ELEVEN ORGANS IN NEONATAL RAT PUPS BORN TO TREATED MOTHERS
Beshoy J. Botros, Sophia R. Larson, and Bruce M. Simat (Advisor)
Department of Biology and Biochemistry
University of Northwestern–St. Paul, St. Paul, MN

JAY W. BUCHTA AWARD FOR EXCELLENCE IN PHYSICS

EDGES: DEEP MULTI-WAVELENGTH PHOTOMETRY AND RADIAL SED ANALYSIS FOR UGC8303 AND UGC8320
Christopher Phenicie and Danny Dale (Advisor)
Department of Physics and Astronomy
University of Minnesota–Twin Cities, Minneapolis, MN

STIRLING P. STACKHOUSE AWARD FOR EXCELLENCE IN SOCIAL SCIENCE

ELUCIDATING THE RELATIONSHIPS BETWEEN ARTHRITIS, DEPRESSION, AND INFLAMMATORY BIOMARKERS IN THE BLOOD: EVIDENCE FROM MIDLIFE DEVELOPMENT IN THE UNITED STATES STUDY II (MIDUS II)
Brandon Young and Serena King (Advisor)
Department of Psychology
Hamline University, St. Paul, MN
SYNTHESIS AND CHARACTERIZATION OF MODIFIED NUCLEOSIDES
Andrea Cragoe and Mitchell Maddox (Advisor)
Chemistry Department
Bethel University, St. Paul, MN

ATOMISTIC INTERPRETATIONS OF OPTICAL ACTIVITY
Sarah N. Elliott and Rollin A. King
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MECHANISTIC INSIGHTS INTO THE ZUMACH-WEISS-KÜHLE SYNTHESIS OF
DITHIASUCCINOYL (Dts)-PROTECTED AMINES
Matthew Henley and George Barany (Advisor)
Department of Chemistry
University of Minnesota–Twin Cities, Minneapolis, MN

A COMBINED COMPUTATIONAL AND EXPERIMENTAL STUDY OF THE FINAL RING
CLOSURE OF BN-PYRENE
Joe Jaye, Ben Gelinas, and Eric H. Fort (Advisor)
Department of Chemistry
University of St. Thomas, St. Paul, MN