**2018 SCHOLAR RESEARCH PAPERS**

**STUDENTS AND TEACHERS AS RESEARCH SCIENTISTS (STARS)**

**Friday, July 20, 2018**

**100/201/206/208/209/217/300/305/311/312 Clark Hall**

**Program Directors:** Dr. Ken Mares, Dr. Charles Granger

**Senior Program Advisor:** Dr. Howard Granok

**Student Advisors:** Ms. Ariel Bulmash, Mr. Phil Berger, Dr. Barry Burnette,

Mr. Michael Fix, Dr. Bruce Hamper, Ms. Jacquelyn Harris,

Dr. Heidi Hope, Mr. Michael Hope, Ms. Meghann Humphries,

Dr. Aparna Kaul, Dr. Carl Oberle, Dr. Robert Pufalh,

Ms. Lisa Snoderly Foster, Dr. Lori Stillwell, Dr. Robin Weinberg,

Ms. Rhonda Woerndle, Ms. Emma Young

**Program Support Coordinator:** Ms. Erica Jackson,

 **Assistant Program Support Coordinator**: Ms. Mahogany Wilson

**Business Support Specialist II:** Ms. Kathy Burney

**Technical Support:** Mr. Adnan Syed

**Ganasri Aleti,** Marquette High School. “Concurrent validity of the neonatal eating outcome assessment: relationships to the neonatal oral-motor assessment scale.” Dr. Bobbi Pineda, Washington University.

**Fatima Ali,** Mary Institute and St. Louis Country Day School. “Empathy reduces bias towards counter-stereotypical gender roles.” Dr. Bettina Casad, University of Missouri-St. Louis.

**Shikha Annem,** Francis Howell North High School.“The effects of confronting sexism on cognitive functioning and psychological well-being.” Dr. Bettina Casad, University of Missouri-St. Louis.

**Mohammed Arif,** Lafayette High School. "Synthesis and characterization of 2,7-disubstituted silafluorenes."  Dr. Janet Braddock-Wilking, University of Missouri-St. Louis.

**Meher Arora,** Parkway North High School. “Temperature regulation of glutathione synthesis in Group B *Streptococcus*.” Dr. Blythe Janowiak, St. Louis University.

**Jesse Au,** Affton High School. “Study of drug release kinetics from modified nanoporous gold wire.” Dr. Keith Stine, University of Missouri-St. Louis.

**Christopher Bakker,** Lafayette High School. “Investigating shifts in the redox potential of FAD when bound to an RNA-FAD aptamer, and optimizing the construction of an electrochemical sensor for detection of FAD**.”**Dr. Dana Baum, St. Louis University.

**Lauren Bell,** Westminster Christian Academy. "Macrophage and cardiomyocyte co-culture: modeling cell interactions in heart failure.” Dr. Kory Lavine, Washington University.

**Matthew Billings,** Chaminade College Preparatory School. “How is the drag of whales calculated?” Dr. Jean Potvin, St. Louis University.

**John Bodnar,** St. Louis University High School. "A comparison of polysaccharides by mass spectrometry.” Dr. Ben Bythell, University of Missouri-St. Louis.

**Neha Bollam,** Marquette High School. “The effect of crosslinker structure on degradation and gelation time in hydrogels.” Dr. Silviya Zustiak, St. Louis University.

**Matthew Boyd,** Parkway West High School. “Vapor pressures and vaporization enthalpies of plant sesquiterpenes by correlation gas chromatography.” Dr. James Chickos, University of Missouri-St. Louis.

**Alec Brooks,** Lafayette High School. “Expression and purification of human heme oxygenase-1.” Dr. Piotr Mak, St. Louis University.

**Patrick Carr,** St. Louis Priory School. “Synthesis of various bismuth vanadate crystal morphologies by the alteration of the crystals’ growing conditions.” Dr. Bryce Sadtler, Washington University.

**Smridh Chandra,** Marquette High School. “Role of endoneurial blood vessels in the progression of CIPN.” Dr. Haiying Zhou, Washington University.

**Arko Chatterjee,** Clayton High School. “Effect of crosslinker structure on hydrogel synthesis and degradation.” Dr. Silviya Zustiak, St. Louis University.

**Nidhi Checka,** Woodbury High School (MN). “Changes in nighttime heart rate variability and circadian rhythm patterns in patients with major depression recovering from myocardial infarction.” Dr. Phyllis Stein, Washington University.

**Haoyuan Chen,** Parkway Central High School. “Application of artificial neural network on additive manufacturing.” Dr. Jianfeng Ma, St. Louis University.

**Rose Coughlin,** Ladue Horton Watkins High School. “Kinetic modelling of the removal of SOx and NOx in power plant emissions.” Dr. Grigoriy Yablonsky, Washington University.

**Kartik Deshpande,** Marquette High School. “Optimized chemical looping combustion using various oxygen carriers simulated with ASPEN Plus.” Dr. Ramesh Agarwal, Washington University.

**Jeffrey Desloge,** Mary Institute and St. Louis Country Day School. “Martian minerals: the oxidation of manganese by oxychlorine species on Mars.” Dr. Jeffrey Catalano, Washington University.

**Varun Devraj,** Marquette High School. “Investigation of photosynthetic parameters in the algal species *Chlamydomonas reinhardtii*.” Dr. Ru Zhang, Donald Danforth Plant Science Center.

**Saida Donaldson,** University City High School. “Impact and importance of bioconjugate vaccines.” Dr. Bruce Hamper, University of Missouri-St. Louis.

**Collin Funck,** St. Louis University High School. “On the regions of curvature propensity in viral dsDNA.” Dr. Cynthia Dupureur, University of Missouri-St. Louis.

**Shreya Gautam**, Marquette High School. “The relationships between parental divorce and cognitive functioning and brain integrity.” Dr. Rachel Wamser Nanney, University of Missouri-St. Louis.

**Justin Guilak**, Clayton High School. “Interactions between lead (IV) oxides and aqueous lead(II).” Dr Daniel Giammar, Washington University.

**Haniya Habib,** Mary Institute and St. Louis Country Day School. “The Role of the G Protein-Coupled Estrogen Receptor in the Neural Growth of Rat Hippocampal Neurons.” Dr. Fenglian Xu, St. Louis University.

**David Higuchi,** Clayton High School. “Perturbation of Cbf1 regulatory protein using 𝛽-estradiol induced artificial transcription factor in yeast.” Dr. Michael Brent, Washington University.

**Daniel Hochberg,** Mary Institute and St. Louis Country Day School. “Determining phospholipase D interaction with autophagy protein ATG8 in *Arabidopsis thaliana.”* Dr. Sam Wang, University of Missouri-St. Louis.

**Yijin Huang,** Marquette High School. “Haplotypes for familial X-Linked hypophosphatemic rickets patients with the PHEX 3’-UTR c.\*231A>G mutation near the polyadenylation signal suggest a relation to a genetic founder.” Dr Steven Mumm, Washington University.

**Margaret Hughes,** Crossroads College Preparatory School. “The immediate impact of gentle human touch on preterm infant physiology and behavior.” Dr. Bobbi Pineda, Washington University.

**Anik Jain,** Ladue Horton Watkins High School. “Alterations in hepatobiliary receptors with carbamazepine in an ambulatory TPN model.” Dr. Ajay Jain, St. Louis University.

**Nandini Jain,** John Burroughs School. “Using remote sensing and machine learning to map forest fragmentation in Madagascar.” Dr. Vasit Sagan, St. Louis University.

**Sathvika Janga,** Rockwood Summit High School. “The effect of renal denervation on variable blood pressure responses to stress in borderline hypertensive rats.” Dr. Mark Knuepfer, St. Louis University.

**Jan Kasal,** John Burroughs School. “The evaluation of PEG-PLGA microparticles for sustained delivery of anti-inflammatory drugs for treatment of osteoarthritis." Dr. Lori Setton, Washington University.

**Varun Kathawate,** Rochester Adams High School (MI). "Examining the effect of divorce occurrence on cognitive ability in affected children." Dr. Rachel Wamser Nanney, University of Missouri-St. Louis.

**Zaid Khaja,** Lindbergh High School. “My place versus your place? The effect of ecosystem engineering on the local abundance of secondary inhabitants.” Dr. Robert Marquis, University of Missouri-St. Louis.

**Ellie Khojasteh,** Visitation Academy. “Empathy reduces bias towards counter-stereotypical gender roles.” Dr. Bettina Casad, University of Missouri-St. Louis.

**Ian Kinsel,** Carbondale Community High School. “A facile gold nanoisland decoration plasmonic  paper for chemical trace detection.” Dr. Srikanth Singamaneni, Washington University.

**Malavika Kumaran,** Ladue Horton Watkins High School. “Differences in social and community participation between people with disability with and without depression.” Dr. Susy Stark, Washington University.

**Zifeng Christy Liang,** Miss Hall’s School (MA). "Comparison of Type I interferon expression in adult and neonatal mice during respiratory viral infection.” Dr. Laurie Shornick, St. Louis University.

**Feng wei Liu,** Westminster Christian Academy. “Identifying the genotype of auxin importer gene mutants of *Setaria viridis.”* Dr. Elizabeth Kellogg, Donald Danforth Plant Science Center.

**Michael Lu,** Lafayette High School. “The impacts of varying freezing factors upon the macro and micro structures of cryogels.” Dr. Scott Sell, St. Louis University.

**Ethan Lumbantobing,** Lafayette High School. "The effects of metal oxide nanoparticles on the germination of tomato and lettuce seeds.” Dr. Ramesh Raliya, Washington University.

**Nina Maitra,** Parkway West High School. "Attitudes and willingness of emergency medicine residents to report to work during an earthquake or pandemic.” Dr. Terri Rebmann, St. Louis University.

**Sujay Marisetty,** Pleasant Valley High School (IA). “Galmydar: assessment of

chemotherapeutic-induced impairment of mitochondrial function in rat cardiomyoblasts using live cell imaging.” Dr. Vijay Sharma, Washington University.

**Shahzan Mian,** Parkway West High School. “The rotational analysis of the (3,0) and (6,0) vibrational bands of the [13.6] Ω = 3/2 - X Ω = 3/2 transition  of platinum chloride through intracavity laser spectroscopy.” Dr. James O'Brien and Dr. Leah O'Brien, University of Missouri-St. Louis, Southern Illinois University-Edwardsville.

**Divya Minnaganti,** Parkway Central High School. “Identifying gene deletions in engineered *Cryptococcus neoformans* strains that may be linked to chitosan regulation.” Dr. Jennifer Lodge, Washington University.

**Rishith Mishra,** Francis Howell Central High School. “Differences in neurobehavior between preterm and full term infants.” Dr. Bobbi Pineda, Washington University.

**Elijah Montgomery,** De Smet Jesuit High. “Drug candidate screening for focal adhesion kinase through molecular docking.” Dr. Chung Wong, University of Missouri-St. Louis.

**Yerin Moon,** Parkway Central High School. “FeTBAP as a peroxidase and insulin mimetic in skeletal muscle.” Dr. Jonathan Fisher, St. Louis University.

**Evan Moss,** Lindbergh High School. “Determining the effect of targeted drugs on GLUT1 expression and 18F-FDG uptake in two breast cancer cell lines with different susceptibilities: PyMT-BO1 and 4T1.” Dr. Samuel Achilefu, Washington University.

**Srujay Pandiri,** Mary Institute and St. Louis Country Day School. “The role of endoneurial blood vessels in the progression of CIPN.” Dr. Mikhail Berezin, Washington University.

**Rajdeep Paul,** Ladue Horton Watkins High School. “Investigating the relationship between loss-of-function mutations in *CLE* Genes *FON2*, *FOS1-1*, and *FOS1-2* and meristem development in *S. viridis.”* Dr. Elizabeth Kellogg, Donald Danforth Plant Science Center.

**Neha Potta,** Parkway South High School. “The effect of Miglustat on bone mineralization in a murine model of infantile hypophosphatasia.” Dr. Adriana Montaño, St. Louis University.

**Rida Qazi,** Mary Institute and St. Louis Country Day School. “Anticipatory interference in younger and older adults.” Dr. David Balota, Washington University.

**Ayush Ray,** Lafayette High School. "The effects of mi-RNA overexpression on PD genes in SH-SY5Y cells after Puf Protein interaction.” Dr. Wendy Olivas, University of Missouri-St. Louis.

**Emily Ristevski,** Liberty High School (Wentzville). “The TRIM Reaper: The role of TRIM23 in cell death of MPNSTs.” Dr. Angela Hirbe, Washington University.

**John Ruyle,** St. Louis University High School. “Mechanism of bone formation during mouse digit regeneration.” Dr. Farshid Guilak, Washington University.

**Avinav Saini,** Westwood High School (TX). “Development of a preclinical NF1-MPNST platform suitable for precision oncology drug discovery and evaluation.” Dr. Angela Hirbe, Washington University.

**Shree Samavedhi,** Lafayette High School. “Enhanced unsharp mask filtering.” Dr. Henry Kang, University of Missouri-St. Louis.

**Darryl Sams,** Clayton High School. “Analyzing the relationship between perceived discrimination and heart rate variability among older African Americans.” Dr. Phyllis Stein, Washington University.

**Nicholas Schmitz,** St. Charles West High School. “Validation of a small-molecule ATP non-competitive p38 inhibitor that selectively blocks the activation of the MK2 substrate.” Dr. Barry Burnette, Confluence Discovery Technologies.

**Mahima Shahrawat,** Fort Zumwalt East High School. “Cloning Pol IV / V to confirm role in seed size regulation.” Dr. Wenyan Xiao, St. Louis University.

**Kate Sheeley,** Nerinx Hall High School. "Incorporation of alginic acid nanoparticles into electrospun fibers for autologous growth hormone delivery.” Dr. Scott Sell, St. Louis University.

**Lily Sheets,** John Burroughs School. “The relationship between higher evolutionary learning and predation in flies.” Dr. Aimee Dunlap, University of Missouri-St. Louis.

**Sohil Singh,** Brookfield Academy (WI). “Assessment of fluorescent heterocycles for molecular imaging of misfolded protein aggregates in Alzheimer’s disease.” Dr. Vijay Sharma, Washington University.

**Satyanarayanan Sivasankar,** Fort Zumwalt West High School. “An analysis of the role of phospholipase Dε in autophagy and growth of soybean (*Glycine max*) plants under nitrogen deprivation.” Dr. Sam Wang, University of Missouri-St. Louis.

**Vedha Srigiri,** Parkway South High School. “Galmydar: assessment of chemotherapeutic-induced impairment of mitochondrial function in rat cardiomyoblasts using live cell imaging.”  Dr. Vijay Sharma, Washington University.

**Divya Srihari,** John Burroughs School. "The effect of CPAP titration during split-night studies on HRV markers associated with sleep apnea and HRV measures of parasympathetic activity.” Dr. Phyllis Stein, Washington University.

**Ioannis Stamoulis,** Anatolia College IBDP (Greece). "Perceptually-based edge detection.” Dr. Henry Kang, University of Missouri-St. Louis.

**Daniel Steinmeyer,** Rockwood Summit High School. “How much sweetener is in Splenda? Analysis of commercial sweetener products by HPLC/MS.” Dr. Ben Bythell, University of Missouri-St. Louis.

**Rubina Thomas,** Parkway North High School. “Hepatic histopathology with carbamazepine in an ambulatory neonatal pig.” Dr. Ajay Jain, St. Louis University.

**Hikari Umemori,** Clayton High School. “Examination of the evaluative quality of participation in personal care between people with physical, visual, and hearing impairment.”  Dr. Susy Stark, Washington University.

**Adam Urish,** St. Louis Priory School. “Effect of learned stimuli on the foraging patterns of *Euglossa dilemma*.” Dr. Aimee Dunlap, University of Missouri-St. Louis.

**Elvis Wei,** Lafayette High School. “Construction and performance evaluation of a mass detector setup to aid in time-of-flight mass spectrometry photoelectron imaging.” Dr. Richard Mabbs, Washington University.

**Thomas Wu,** St. Louis University High School. “Analysis of the rotational structure of the (6,0) vibrational band of the [13.6] Ω=3/2‑*X*Ω=3/2transition of platinum chloride using intracavity laser spectroscopy.” Dr. James O'Brien and Dr. Leah O'Brien, University of Missouri-St. Louis, Southern Illinois University-Edwardsville.

**David Yang,** Francis Howell High School. “Evaluating mineral proxies of microbial sulphate reduction in Santa Monica Basin sediments.” Dr. David Fike and Dr. Jennifer Houghton, Washington University.

**Matthew Yee,** John Burroughs School. “Synchronization-desynchronization transitions with globally coupled electrochemical oscillators.” Dr. Istvan Kiss, St. Louis University.

**Lexi Young,** John Burroughs School. “Effects of urea on RNA duplex stability.” Dr. Brent Znosko, St. Louis University.

**Anna Grace Yuska,** Mary Institute and St. Louis Country Day School. “Using near-infrared spectroscopy and pulse oximetry measures for an individualized approach to red blood cell transfusion in premature infants.” Dr. Amit Mathur, Washington University.

**Jason Zhou,** John Burroughs School. “Collecting phosphate in the form of Struvite using an organic template.” Dr. Young-Shin Jun, Washington University.

**2018 STARS Research Associates**

**Preston Bruce**, Claflin University. Dr. Robert Marquis, University of Missouri-St. Louis

**Della Renee Cox**, U. of Missouri-Columbia. Dr. Aimee Dunlap, University of Missouri-St. Louis

**Alexander Curylo**, Rice University, Dr. Fuzhong Zhang, Washington University.

**Nina Kaiser**, Saint Louis University. Dr. Patricia Cavazos-Rehg, Washington University

**Sudheesha Paladugu**, University of North Carolina-Chapel Hill. Dr. Fenglian Xu, Saint Louis University

**John Tschampel**, University of Missouri-Columbia. Dr. Ben Bythell, University of Missouri-St. Louis

**Preston Willis**, Case Western Reserve University. Dr. David Fike, Washington U. and Dr. Jennifer Houghton, Washington U.