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MESSAGE FROM DIRECTOR

Welcome to the 2018 issue of the University of Utah's *Undergraduate Research Journal*. Congratulations to the students who have published their important work here—the *Undergraduate Research Journal* collects and celebrates the contributions our undergraduate students from all over campus make to scholarship in their fields.

This journal would not be possible without the dedication of Cindy Greaves, who, along with Office of Undergraduate Research team members Stephanie Shiver, Katie Sexton and Megan Shannahan, works to make the *Undergraduate Research Journal* the high-quality publication that you are reading today.

I would, as always, like to acknowledge the dedication and support of the faculty mentors who are committed to providing high-quality research experiences for undergraduate students at the University of Utah. The work published here represents countless hours of mentoring on the part of my colleagues all over campus—thank you for all that you do.

Happy reading, all!

Sincerely,

Rachel Hayes-Harb
Director, Office of Undergraduate Research
Associate Dean, Undergraduate Studies
Professor, Department of Linguistics

COLLEGE OF ARCHITECTURE + PLANNING

- Aging in Place - Creating a Life-Space (Jordan Pieper, Ivis Garcia)

COLLEGE OF EDUCATION

- Voice-Activated Digital Assistant: An Application for Teacher Professional Development and Technology Integration (Julia Larkin, Eric Poitras)
- Year One Program Evaluation For The University Of Utah Prison Education Project (Erin Feeley, Erin Castro)
- Young Readers' Interactions with Storybook Apps (Carlie Haacke, Lauren Liang)

COLLEGE OF ENGINEERING

- A Parametric Finite Element Study of Collagen Fiber Orientation in Lumbar Intervertebral Discs (Christine DeDen, Benjamin Ellis)
- Computational Fluid Dynamics Modeling Of Pulmonary Airflow Patterns Of Python Regius (Steffan Sowards, Colleen Farmer, Robert Cieri)
- Constructing Neurotrophic Gradient-Generating Peripheral Nerve Conduits and Assays to Measure Functional Outcomes (Claire Ticknor, Jill Shea)
- Cross-Linking Carboxymethyl Cellulose And Chitosan With Citric Acid (Jaxon Roller, Jeff Bates)
- Developing And Optimizing A Protective Skateboard Shoe Patch Designed To Extend The Life Of The Shoe (Dakota Burton, Raymond Cutler)
- Development Of A Standardized Procedure For The Evaluation And Comparison Of Wearable Self-Powered Devices, To Be Applied In The Design And Testing Of Self-Powered Wearable Health Sensors (Michael Peterson, Shad Roundy)
- Dual Reservoir Nerve Guide Conduit With FK506 And GDNF As A Novel Approach For Peripheral Nerve Regeneration (Ria Sandhu, Jill Shea)

- Epigenome Editing Of TGF-BETA Receptors Using DCAS9-KRAB System To Alter Mesenchymal Stem Cell Differentiation Potential (**Paul Wissler**, Robert Bowles)
- Finite Element Analysis Suggests Stress Increases in the Pars Interarticularis with Increasing Unilaminectomy Bone Resection (**Arielle Hassett**, Benjamin Ellis)
- Functional And Structural Remodeling In Heart Failure: A Potential Predictor Of Cardiac Recovery In Patients With Left Ventricle Assist Devices (**Younjee Lee**, Frank Sachse)
- Managing Chronic Musculoskeletal Pain With Combined Modalities In Nanoxene And Thermally Responsive Polymer Networks (**Jesus Gomez**, Feng Liu)
- Multivalent Human Serum Albumin - Anti-CD20 Fab' Conjugates Induce Apoptosis in Lymphoma Cell Analogs (**Christian Kodele**, Jindrich Kopecek)
- Non-Anthropomorphic Deep Learning: Developing The "Eyes For The Internet Of Things" (**Stefan Kapetanovic**, Rajesh Menon)
- Optimization and Drug Release Kinetics of a Bioresorbable Nerve Conduit (**Alexander Shu**, Jill Shea)
- Peptide Attachment to Vessel Wall (**William Anderl**, Kenneth Monson)
- Sintered Fluorapatite Expresses Early Mineralization Markers in In Vitro Studies (**Asmita Dulal**, Sujee Jeyapalina)
- Subject Specific Analysis Of Chondrolabral Stresses In A Patient With Cam Femoroacetabular Impingement (**Samuel Colby**, Penny Atkins, Andrew Anderson)
- The Effect of Nanomaterials on E. coli Growth (**Gemma Clark**, Jennifer Weidhaas, Ramesh Goel)
- The Effect Of The Utah mEWS Alert System On The Detection Of Sepsis At The University Of Utah Hospital (**Emilie Laura Ungricht**, Devin Horton, Kencee Graves)
- Utilization of Machine Learning to Build a Price Prediction Model for Raw Minerals Sourcing (**Brennan Theler**, Brennan Theler)

COLLEGE OF FINE ARTS

- Creating a Devised Theatrical Piece to Travel to the Edinburgh Fringe Festival (Cecelia Otto, Robert Scott Smith)
- Global Contemporary Art and the American Education System (Mary Stringham, Sarah Hollenberg)
- The Female Bildungsroman through Movement and Performance (Rachel Luebbert, Ellen Bromberg)
- What We Tell Children: Queer Representation in Children's Animation (Christal Rose A. Hazelton, Lien Fan Shen)

COLLEGE OF HEALTH

- Agreement of 4- and 10-Meter Gait Speed on Individuals with Chronic Stroke (Mary Ngo, Heather Hayes)
- Dietary supplementation of blueberry modifies NFκB signaling in the aortic vessels of diabetic mice (Samantha Nelson, Anandh Babu Pon Velayutham)
- Down to the Wire: Identical Traumatic Injuries in a Field Setting: A Case Study (Samantha Offret, Jessica Tidswell)
- Effect of blueberry supplementation on vascular NADPH oxidases in db/db mice (Jessica Bigley, Anandh Babu Pon Velayutham)
- Effects Of Marked Intonation On A Restricted Scope Configuration (Luke Tuttle, Aniko Csirmaz)
- Effects of Metformin on Recovery of Muscle Mass and Mitochondrial Function in Older Hindlimb Unloaded Mice (William Steiner, Micah Drummond)
- Effects of Mindfulness on Postural Stability (Tyler Gill, Charlie Hicks-Little)
- Heterotopic Ossification Following Hip Arthroscopy In A Patient With Nsaid Hypersensitivity: A Case Report (Benjamin Cassidy, Charlie Hicks-Little)
- Pilot Project: Quality of Childcare (Megan Shaw, Caren Frost)

- RESTORED: Promoting Resilience After Stroke in Dyads (**Artemis Sefandonakis**, Alexandra Terrill)
- Role of skeletal muscle macrophages in inactivity-induced insulin resistance (**Nikol Yonemura**, Paul Reidy, Alec McKenzie, Ziad Mahmassani, Paul LaStayo, Alex You Kuei Lin, Micah Drummond)

COLLEGE OF HUMANITIES

- Believing Science Satire: Factors that Contribute to Misinterpretation of "Fake News" (**Andrew Lake**, Sara Yeo)
- Disabling Science Fiction (**Casey Koldewyn**, Jenny Andrus)
- Gamification of Biology Literacy (**Megan Tyler**, Maureen Mathison)
- Parental Lies And Empathy In The Curious Incident Of The Dog In The Night-Time (**Kaelyn Leonard**, Angela Smith)
- Policies and Procedures in the Communication and Collaboration of IEP Team Members for AUtistic Children (**Natasha Eldredge Anderson**, Natasha Seegert)
- Survival English Literacy for Pre-Literate and Non-Literate Adult Refugees (**Michelle Rohbock**, Jeff Metcalf)
- The Utes Nickname: Mascots, Symbols, And Nicknames A Critical Discourse Analysis (**Cassidy Hoff**, Danielle Endres)
- Ute Nickname Research Project: The Rhetoric Surrounding The University Of Utah's Nickname On Social Media And Its Influence On Representation Of The Ute Nation (**Sarah Patterson**, Danielle Endres)

COLLEGE OF MINES AND EARTH SCIENCES

- Electrochemical Analysis of MgCl₂/KCl/NaCl Molten Salt Candidate Heat Transfer Fluid for Concentrating Solar Power (**Nicole Orabona**, Michael Simpson)
- Field Analysis and Verification of The Yankee Total Precipitation Sensor (Tps-3100) (**Zachary Rieck**, Jim Steenburgh)
- Investigating the Weather Conditions Near Wildfires (**Laura Snelling**, John Horel)

- Lake Generated Microseisms at Yellowstone Lake as A Record of Ice Phenology (**Aini Ashiqin Mohd Mokhd**, Keith Koper, Relu Burlacu)
- Movement of Sandstone Arches As A Repose To Thermal Cycles (**Jackson Bodtker**, Jeffery Moore)
- The Histological Ontogeny of Ornamented Trionychians From The Kaiparowits Formation Of Utah (**Nathan Ong**, Randall Irmis)
- The Intermountain West and Epa Ozone Standards (**Braden Cluster**, Gannet Hallar)

COLLEGE OF NURSING

- Healthcare Encounters of Formerly Homeless Individuals Supported by the Housing First Program (**Hailey McLean**, Sara Hart)
- Improving Recruitment and Retention in Mental Health Research Studies Using Enhanced Enrollment Interviews (**Christina Triptow**, Katherine Supiano)

COLLEGE OF PHARMACY

- Effects Of Mitochondrial Mobility On Astrocyte Function (Sarah Smith, Karen Wilcox)
Fluorogenic Probes for Enzyme Activity (**Ronak Intwala**, Amy Barrios)
- Split-Luciferase Tag With Multifaceted Utility In The Production And Interrogation Of Purified Proteins (**Samuel Hatch**, Sun Jin Kim, Shawn Owen)

COLLEGE OF SCIENCE

- Chemoreceptor Signaling Role of Tsr Residue G393 (**Tyler Crum**, John Parkinsob)
- Comparing The Learning Outcomes In Science Outreach Between Elementary Charter Schools And Title One Elementary Schools (**Atoosa M. Samani**, Perna Kamath, Mikayla Rosequist, Rebecca King, Bradford Stockman, Amy Sibul)
- Exploring Computational Networks Across an Entire Brain at Single Cell Resolution (**Hayli Spence**, Dimitri Traenkner)
- Expression And Purification Of Augerotoxins: Searching For Novel Protein Folds In Venomous Marine Snails (**Kacey Davis**, Martin Horvath)

- Fusing Stem Content with Hip Hop and Electronic Music to Create Educational Songs (Rohan Barkley, Jared Rawlings)
- Gender Differences and The Learning Outcomes in Science Outreach (Atoosa M. Samani, Prerna Kamath, Mikayla Rosequist, Amy Sibul)
- Generating Minimum Population Size Estimate For Brown Bears In Eastern Turkey Using Multilocus Genotyping (Bryce Alex, Çağan Şekercioğlu)
- Major Urinary Proteins As A Signal Of Genetic Quality And Infection Status (Cassidy Pearson, Wayne Potts)
- Making Octahedral Particles (Miles Robertson, David Belnap)
- Nanoparticle Catalysts For Suzuki Cross-Coupling (Julia Peek, Ilya Zharov)
- Reconstruction of Cosmic Ray Geometry Using Cherenkov Backscattering (Matthew Dutson, Douglas Bergman)
- Sex-Biased Reciprocal Virulence And Transmission Dynamics Due To Friend Virus Complex Infection Of Mice (Sophie Marissa Trujillo, Douglas H. Cornwall, James S. Ruff, Wayne Potts)
- Testing the Perceptual Salience of Spectral Content in Zebra Finch Song (Jessica Roestenburg, Franz Goller)
- The Synthesis And Application Of (2,2-Methoxyethoxy) (2-Nitrobenzyl) 2,4-Dichlorophenoxyacetate As A Caged Auxin In The Auxin-Inducible Degradation (Aid) System In C. Elegans (Raymond Reynolds, Helen H. Kang, Jen Heemstra)
- Thermoelectric Measurements of a Metal-Organic Framework (Celine Slam, Vikram Deshpande)
- Using Targeted Mutagenesis By Crispr/Cas9 In C. Elegans To Study The Structure And Function Of Syp-3 In Meiosis (Stuart Cai, Ofer Rog)

COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCE

- A Brief Overview Of The Fedwire System (Michael Green, Connor Durrant, Qianjie Hu, Kaden Kehl, Elizabeth Prathan, Luciano Pesci)

- Activation and Construction of Ethnic Markers in an Immigrant community (**Alina Paegle**, Adrian Bell)
- Black Bones: Distinguishing Burned from Stained (**April Keene**, Jack Broughton)
- Cardiovascular Functioning in Interaction: A Theory Comparison (**Yamina Castro**, Timothy Smith)
- Comparing Educational Engagement And Extracurricular Activity Participation For First-Generation Versus Continuing-Generation College Students (**Eric Nhem**, Carol Sansone)
- Depressive Disorder And Personality After Mastectomy (**Yae Ji Kim**, Ansuk Jeong)
- "Determined to Make Righteous Homes": LDS Expressions of Masculinity in Emerging Adulthood (**Warren Jensen**, Claudia Geist)
- Development of The Portrayal of Historical Events and Perceived Discrimination Towards Racially Ambiguous Individuals Study (**Natalia Abril**, Jacqueline Chen)
- Dual Exchange Rates (**Nicky Alamo**, Cole McCubbins, Luciano Pesci)
- Educational Programming: A Coping and Distraction Technique in Pediatric Hospital Settings (**Amanda Groneman**, Marissa Diener)
- Effect of Racist Labeling Threat on Attention (**Sophia Hill**, Jacqueline Chen, Paul White)
- Effective Strategies In Grassroots Movements: Role Of Campaign Operations (**Che Diaz Fadel**, Luciano Pesci)
- Effects of El Niño on Holocene rodent populations in northern Baja California, Mexico (**Kaley Tucker**, Jack Broughton)
- Efficacy Of Volunteer Weed Pull Programs On Management Of Myrtle Spurge (Euphorbia Myrsinites) In The Foothills Of Salt Lake City, Utah (**Brianna Milot**, Jennifer Shah)
- Examining Epigenetic Processes In Infants Exposed To Prenatal Stress (**Michelle Ngo**, Elisabeth Conradt, Sheila Crowell)
- Expedient Toolstone Use Over Distance In The Lower Dolores River Valley In East-Central Utah (**Brock James**, Brian Coddington)
- Finding "Hidden Talents" In Childhood Adversity (**Marilynn Santana**, Bruce Ellis)

- Inequality and Altruism: A Macro-Level of Analysis (**Delaney Dangerfield**, Brian Coddington)
- Investigating Static And Dynamic Spatial Abilities In Dancers (**Natalie McElroy**, Erica Barhorst-Cates, Jeanine Stefanucci, Margaret R. Tarampi)
- Karl Marx: Right, for the Wrong Reason (**David Williams**, Luciano Pesci)
- Maternal Borderline Personality Symptoms and Stress Responding During Pregnancy as Predictors of Newborn Neurobehavior (**Ashley Allen**, Elisabeth Conradt)
- Neural processing of repeated targets: How are previously encountered targets represented in memory? (**Alexis Torres**, Trafton Drew)
- Paleoecological Reconstruction Of Ancient Lake Bonneville Through Sediment Analysis (**Myrna Groomer**, Andrea Brunelle)
- Prescription Narcotic and Illicit Drug abuse (**Patrick Warr**, Erin Jensen)
- Reconstructing a Fire History Record and Disturbance Patterns for a High Elevation Site in the Northern Rocky Mountains (**Jordin Hartley**, Jennifer Watt)
- Reflection On My Work As A Research Assistant In Dr. Himle's Lab (**Alexis Sheffield**, Michael Himle)
- Refugee Families Living In Permanent Supportive Housing: Perceptions Of Utilization And Barriers To Health Care (**Austin Waters**, Sara Hart)
- Solar Roadways (**Shams Islam**, Travis Hakala, Luciano Pesci)
- Stress Management Classes For Uninsured Free Clinic Patients In The United States (**Rebecca Higham**, Akiko Kamimura)
- Study of Utah's Climatic History by Analysis of Lake Core Sediment Collected from Lake Bonneville Site (**Marianne Newell**, Andrea Brunelle)
- The Autism Spectrum (Taylor Russell, Cheryl Wright, Valerie D'Astous)
- The Effects of Air Pollution Salience And Place Attachment On Supporting An Environmental Organization (**Hannah Samowitz**, Monisha Pasupathi)
- The Effect of Competition on Patient Care (**Collin Toyn**, Luciano Pesci)

- The Expansion and Management of Executive Power and the Role of Executive Orders in the United States, 2001-2017 (**Connor Nelson**, James Curry)
- The Influence of El Niño on Marine Mammal Abundance and Human Habitation of Coastal Baja California, Mexico: Evidence From Abrigo De Los Escorpiones (**John Doyle**, Jack Broughton)
- The Role of Emotion Regulation in Sleep and Suicide: A Preliminary Analysis (**Steven Carlson**, Timothy Smith)
- The Tenets of Change (**Charles Fratt**, Luciano Pesci)
- The Well-being of Patients with Myasthenia Gravis (**Yu Kyoung Kang**, Ansuk Jeong)

COLLEGE OF SOCIAL WORK

- Experiences of Women Using Third-Party Reproduction (**Brialyn Hassett**, Lindsay Gezinski)

SCHOOL FOR CULTURAL AND SOCIAL TRANSFORMATION

- Can Reproductive Freedom Be Achieved By Decolonizing What Pleasure, Love, And Resistance Look Like? Cases Of Womxn Of Color Facing Reproductive Injustices (**Kiman Kaur**, Susie Porter)
- Research Difficulties Related to Queer History (**Kris L. Glad**, Susie Porter)

SCHOOL OF BUSINESS

- Career Immersion Prior To Graduation: An Analysis Of The Efficacy Of Student Marketing Agencies (**Kira Wachter**, Bill Oakley)

SCHOOL OF MEDICINE

- 2D Continuous Simultaneous Multi-Slice (CSMS) MR Imaging To Quantify Cardiac Perfusion (**Tyler Bodily**, Edward DiBella)
- Career Immersion Prior To Graduation: An Analysis Of The Efficacy Of Student Marketing Agencies (**Kira Wachter**, Bill Oakley)

- Association Of NFATC1 With Atrial Fibrillation (**Saba Saleem**, Martin Tristani-Firouzi)
- Bestrophin-1 Chloride Channel in Drosophila Melanogaster (**Jacob Hudac**, Aylin Rodan)
- Binding VEGF-C/D- VEGFR-3 Signaling to Inhibit Tumor Lymphangiogenesis and Lymphatic Metastasis (**Leda Erlandson**, Susie Choi, Balamurali Ambati)
- Carvedilol Improves Hypoglycemia Awareness in Rats (**Levi Neely**, Owen Chan)
- Correction of mutation in atrial fibrillation susceptibility gene NFATc1 using CRISPR-Cas9 systems (**Karissa Wang**, Martin Tristani-Firouzi)
- Creating an Odor Presenting Device to Map the Olfactory Bulb (**Michael Guo**, Mia Wipfel, Matt Wachowiak)
- Development of a Sensor Metadata Library for Exposomic Studies (**Nicole Burnett**, Ramikiran Gouripeddi)
- Establishing A System For Structure-Function Analysis Of The Novel Role That NUP153 Plays In Nuclear Assembly (**Marianne Mercer**, Katharine Ullman)
- Generating TRPV1 And Gcamp6 Double-Transgenic Mice To Study Muscle Pain (**Naomi Baende**, Leslie Mendoza, Trevon Michael, Alan Light, Ron Huguen, Jie Zhang)
- Identifying natural genetic modifiers of apoptosis and retinal degeneration (**Elaine Ong**, Rebecca A.S. Palu, Shani Chung, Clement Chow)
- Investigating the role of Smyd5 in heart disease (**Anna Jacobsen**, Sarah Franklin)
- Is altered autophagy the cause of cell death in AML cells following SIRT5 knockdown? (**Siddharth Iyer**, Anthony D. Pomiciter, Thomas O'Hare, Michael W. Deininger)
- Kinematics Of The First And Fifth Metatarsals As Determined By High-Speed Dual Fluoroscopy (**Konstantinos Karpos**, Koren E. Roach, Jennifer Nichols, Andrew E. Anderson)
- Prediction of oral health outcomes in the era of precision medicine (**Megan Rosales**, Man Hung)
- Predilection Of Keratinocyte Carcinoma Skin Cancer By Age And Sex (**LaVar Edwards**, Aaron Secrest)

- Representing the Molecular Basis of Exposomic Research (**Nicole Burnett**, Ramikiran Gouripeddi)
- Structural Maturity of Induced Pluripotent Stem Cell-Derived Cardiomyocytes Depends On Growing Environment (**Madelina James**, Martin Tristani, Ema Parker, Enrique Coca, Scott Cho, Alonso Cook, Natalia Torres)
- The effect of the loss of nonsense-mediated mRNA decay on naturally occurring variants (**Ashley Wiltsie**, Mark Metzstein)
- The Effects of Negative Pressure Wound Treatment on Blood Vessel Density Around Percutaneous Devices (**Kelli Hafer**, Kent Bachus)
- The One-Carbon Pathway And Cardiac Function Recovery For Heart Failure Patients On Lvad Treatment (**Randy Chou**, Stavros Drakos)
- The Role Of Enzyme And Substrate Dependence In No-Mediated Vascular Dysfunction With Aging (**Daniela Vidal**, Russell Richardson)
- The Role Of The Pentose Phosphate Pathway In Lvad-Induced Myocardial Recovery From Heart Failure (**Billy Chien**, Stavros Drakos)
- The Roles of Human MIT Proteins in ESCRT Biology (**Eavan Donovan**, Jack Skalicky)
- Understanding the periprosthetic microenvironment surrounding percutaneous devices: Use of simple immunohistochemical techniques to predict healing outcomes (**Alysa Edwards**, Sujee Jeyapalina)
- Using FGF21 as a Biomarker for Heart Failure (**Elizabeth Nguyen**, Salah Sommakia, Dinesh Ramadurai, Sutip Navankasattusas, Stavros Drakos, Dipayan Chaudhuri)
- Whisker Trim Experiment: HoxB8 Microglia Function and OCD Behavior in Mice (**Michael Adkins**, Naveen Nagarajan)