



Undergraduate Research Symposium May 17, 2019 Mary Gates Hall

Online Proceedings

POSTER SESSION 3

Commons West, Easel 37

2:30 PM to 4:00 PM

Healthcare Providers' Perceptions of Value of Mobile Health Technology to Improve Patient Care

Jason Michael Muncy, Senior, Healthcare Leadership (Tacoma Campus)

Mentor: Sharon Laing, Nursing and Healthcare Leadership Program

Technology has evolved in ways that allow healthcare professionals to improve patient outcomes through personal electronic devices such as smartphones or healthcare applications. These advances have allowed patients to manually or automatically record personal health information which can then be sent to their provider for real time assessments. The purpose of this study was to evaluate healthcare providers' perceptions about the value of digital healthcare technology in improving healthcare outcomes for low-resourced communities. We hypothesized that healthcare providers will report that mobile health technologies can be a valuable innovation to support patient wellness and improve health outcomes. To test our hypothesis, we recruited N=20 healthcare providers from Washington, state. Healthcare providers comprising physicians, medical assistants, nurses, and social workers participated in a 60-minute focus group and asked about the role of technology in improving healthcare services for their patients. Participants received a \$75 gift certificate at the end of the session and responses were transcribed for later assessment. We evaluated transcripts by deriving code-words, codewords used more than two times were identified and recorded on three separate trials, codewords with similar information were grouped into codeword clusters, and finally, themes were derived based on a single idea from code-word clusters. Results of our study revealed that providers perceived value of smartphones/mobile health technologies to improve patient health outcome through data tracking and increased accuracy of reported health information. The implication of our finding is that mobile healthcare technologies can support the work of healthcare providers by accurately tracking patient health status and thus support treatment delivery.

POSTER SESSION 3

Balcony, Easel 110

2:30 PM to 4:00 PM

Controlling Amyloid-Beta Protein Aggregation by Auxin-Induced UL12.5 Expression

Keong Mu Jason (Jason) Lim, Junior, Pre-Sciences UW Honors Program

Mentor: Jason Pitt, Pathology

Mentor: Matt Kaeberlein, Pathology

Mentor: Brock Johnson, Pathology

Neurodegenerative diseases, such as Alzheimer's (AD), Parkinson's, and Huntington's, affect millions of people. In AD, prior studies indicate the formation and accumulation of amyloid-beta proteins may play a crucial role in the pathology of the disease. The Herpes Simplex Virus (HSV-1) encodes an alkaline nuclease (UL12.5) known to cause degradation of the mitochondrial genome. HSV-1 infection has been previously associated with AD brain pathology. We hypothesize that UL12.5 activity in the brain may predispose an individual to amyloid-beta aggregation and AD neuropathology. Here, we controlled the amyloid-beta protein aggregation using a degraon attached UL12.5, which is induced by the plant hormone auxin through a molecular signaling pathway known as auxin-inducible degraon. We have engineered an auxin UL12.5-degraon construct in order to precisely control the temporal and cell type expression of UL12.5 in *Caenorhabditis elegans* (*C.elegans*). This construct was microinjected into the worms and by using auxin, we controled the expression of UL12.5 and tested its effects on amyloid-beta and Huntington protein aggregation. Here, we have elucidated the relationship between HSV-1 infection, UL12.5 expression, and neurodegenerative disease which may form the basis of novel treatments.

POSTER SESSION 4

Balcony, Easel 118

4:00 PM to 6:00 PM

Molecular Response to Variations in Vascular Morphology in Endothelialized, 3D-Printed Intracranial Aneurysm Models

*Keong Mu Jason (Jason) Lim, Junior, Pre-Sciences
UW Honors Program*

Mentor: Sam Levy, Neurological Surgery

Mentor: Cory Kelly, Neurological Surgery

Mentor: Michael Levitt, Neurological Surgery

Intracranial aneurysms can rupture, leading to hemorrhagic stroke, a devastating and deadly disease. The geometry of vessels plays a crucial role in the onset and molecular pathophysiology of intracranial aneurysm formation. Notably, regions of bifurcation tend to be more susceptible to aneurysm formation. Numerous studies focus solely on the interactions between hemodynamics and vascular geometry or those between hemodynamics and molecular expression changes. Despite the significant relationship between the structure of vessels and the endothelial cell (EC) molecular expression, there has been few investigations tying the relationship between how vascular geometry affects the EC expression, particularly genes known to be related to EC pathological response: ADAMTS-1, VCAM-1, MCP-1, PDGF-B. These genes are implicated in endothelial dysfunction and aneurysm pathophysiology. Here, we aim to see how the geometry of the parent vessel affects endothelial gene expression, using 3D-printed, endothelialized, idealized bifurcation aneurysm models of varying degrees of parent vessel curvature. We then quantify the mRNA and protein expression for the genes associated with endothelial response. By elucidating the relationship between the vessel geometry and EC expression, we hope to contribute in further advancing the modeling of aneurysm pathology.

two pieces, I used the techniques and visual patterns of capturing the geometric shapes of human figures, and the rules of composing art works, and analyzing the shading to get how the light hits on the figures as well as the perspective analysis. Figure study is when human figures exist visually as geometric shape, proportions of figures are supposed to be treated as lines, lines of geometric shapes. In terms of the study of art history, European art is directly derived from the Christianity trinity. The triangle pattern is the central balance of human figure, as human figures are derived from the God himself. The lines form the geometric balance and then the balance itself forms human figures into perfect combination. The light determines the perspective significantly for the dimensions closer to the viewer are thicker while the further side of the dimension are relatively vague in visual. It creates the perspectives of human figures on the drawing. In the photographic term, it's called "depth of field". This enables the figures on paper to be dimensional and closer to real human figures. My conclusion of the drawings as present, is that human eyes is an interesting tool, that gifted the mankind.

VISUAL ARTS & DESIGN SHOWCASE

Odegaard Undergraduate Library

3:00 PM to 4:30 PM

* Note: Titles in order of presentation.

"Power of Uchiha" ("????????????????????") and "Death to Wayne(Wei)"

Jason Liang, Senior, Interdisciplinary Visual Arts

Mentor: Zhi Lin, Art

My pieces are an exploration of how characters from manga and comics intersect with my own identity. The first piece is called the "Power of Uchiha Snake". I am the character Uchiha Sasuke from Naruto who possesses the Uchiha bloodline special visual power Sharingans. The second piece is called "Death to Wayne(Wei)". Adapted from the Deadpool movie poster. Wayne, and "Wei" is the last character of my Chinese name. Deadpool has super power of infinite regeneration. Although he runs his mouth, no matter how mad he gets his enemies, they won't be able to destroy him. For these