



Undergraduate Research Symposium **May 17, 2019 Mary Gates Hall**

Online Proceedings

POSTER SESSION 1

Commons East, Easel 59

11:00 AM to 1:00 PM

Laser Interferometer Gravitational-Wave Observatory (LIGO) Glitch Tracking

Thomas Harris, Junior, Physics, Whitman College

Mentor: Gregory Vaughn-Ogin, Physics, Whitman College

The goal of the Laser Interferometer Gravitational-Wave Observatory (LIGO) detectors is to detect faint ripples in space-time caused by the merger of massive compact objects, like black holes and neutron stars, using a Michelson interferometer with Fabry-Pérot cavities in the 4-kilometer arms. Because the detectors have length change sensitivity on the order of 10^{-20} meters, there are many types of unwanted transient signals that affect the calculated gravitational wave strain signal and interfere with searches for real gravitational waves. These are referred to as glitches; finding the cause of a glitch category is the first step to eliminating it. I searched for the source of 60-200 hertz range glitches known as “scratchy” glitches. I found a correlation between elevated ground motion and detection of scratchy glitches, then estimated false alarm rates for their observed coherence. My research supports on-site efforts to eliminate scratchy glitches.

POSTER SESSION 2

MGH 241, Easel 151

1:00 PM to 2:30 PM

Clinical Pathological Correlations and Re-Imaging Follow Ups for Teledermatology Patients

Maya Kaveri Gopalan, Junior, Pre Public Health

Mentor: Gregory Raugi, Medicine

In 2009, the Department of Veterans Affairs (VA) integrated Store-and-Forward Teledermatology (SFT) to increase the dermatology care to patients with limited access. With this, patients are evaluated by their primary care provider (PCP) and referred to SFT for dermatology conditions. A technician on site takes images of the condition and send records to tele-dermatologist at a reading hub to evaluate and provide a differential diagnosis, treatment, and follow up. When skin biopsies are requested, Clinical Pathological Correlation (CPC) consultations are also requested. Dermatopathology

reports are not standardized well and often require interpretation in context of other clinical information, including history, imaging, and microbiology studies to diagnose. Follow up imaging after an interval of treatment may be requested to confirm the diagnosis. The purpose of this quality improvement study is to assess adherence of PCPs to follow ups, determine whether failure to use means degraded clinical outcomes and interventions to improve outcomes. We conducted a retrospective review of 224 conditions addressed by teledermatology during the month of April 2018, on Veterans in the Pacific Northwest Network (VISN 20) where recommendations for either CPCs, re-imaging, or both were requested. We searched electronic medical records that requested follow-ups and determined a.) whether it occurred (if not, why); b.) timing it occurred; c.) affectability of treatment plans based on follow up findings; and d.) whether conditions were by intervention. Of 224 conditions reviewed, 161 requested CPC consultation, 63 requested reimaging, and 2 requested both. For CPC consultations, 90.06% patients had a re-consult, through CPC process or FTF and 9.4% of cases were lost in care. For reimaging consults, 73% of cases had reimaging or FTF re-consult while 27% of cases were lost in care. Data from this project will be used to improve follow up and quality of care Veterans receive through SFT.

POSTER SESSION 2

MGH 241, Easel 146

1:00 PM to 2:30 PM

Timeline of Care for Veterans With Melanoma in Store-and-Forward Teledermatology (SFT)

Samuel Joseph (Sam) Byrne, Senior, Public Health-Global Health

Mentor: Gregory Raugi, Medicine

Many veterans live in rural areas with limited access to traditional face-to-face (FTF) dermatological services. This barrier to care can result in worse health outcomes. Store-and-Forward Teledermatology (SFT) is a program that aims to address this disparity by providing veterans with increased access to dermatological care. Instead of seeing a dermatologist in person, veterans with suspicious lesions first see a primary care physician (PCP) who then arranges for pictures of the lesions to be taken. These pictures are electronically sent to a dermatologist who reviews them remotely and then suggests a plan of care for the patient. SFT allows veterans to

both avoid potentially long wait times at in-person dermatology offices and address lesions that may have gone untreated. This study focused on the timeline of care for the treatment of melanoma. Because of its lethality, it is important to diagnose and treat melanoma as quickly as possible. In this study we compared the timeline to treatment – from when the lesion was first discovered to the date of its surgical excision – in groups receiving standard FTF dermatological care and SFT care. Using chart data from patients within the VISN 20 network, we retrospectively gathered the dates of discovery, biopsy, and excision in patients. From there, we calculated the mean days from discovery to biopsy and biopsy to excision in both groups. Upon comparing these timelines to each other we found that the overall timeline for SFT was approximately 12 days longer than that for FTF. We identified sections of the SFT process that may be responsible for the delay as potential quality improvement points in the future.

non-minority business owners through an econometric analysis of a dataset collected by the U.S Treasury Department on CDFIs(Community Development Financial Institution Fund). More specifically, my project tests if the differences in the coefficients of predictors for each group are significant. Evidence supporting the hypothesis suggests that banks are losing out on economics gains by overlooking certain factors on their applicants and actions should be taken to prevent further loss for minority business owners.

SESSION 20

ECONOMIC ISSUES

Session Moderator: Michelle Turnovsky, Economics

MGH 389

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Why Do Banks Discriminate? Heterogeneous Effects of Traditional Determinants on Minority vs. Non-Minority Business Loan Default Rate

Anni Hong, Senior, Mathematics, Economics

UW Honors Program

Mentor: Gregory Duncan, Economics/CORE AI

Despite the high growth rate of minority-owned business in the US, economics literature suggests that minority business owners have a harder time getting loans for their businesses compared to their white counterparts. If minority-owned businesses are doing well in the U.S., it is expected that loans to minority owners have high returns (or low defaults). It is paradoxical that banks would discriminate against minority loan applicants since it's against their economic interests. My research project hypothesizes that financial institutions' loan approval process is flawed for assuming that the predictors of loan defaults have the same effect on minorities and non-minorities. For example, credit score is often an important factor in predicting default, however, many minority immigrants haven't had a chance to build up their credits to the same degree as their white counterparts. In this case, a low credit score means a high probability of default for white business owners but does not predict a high default rate for non-white owners. To test the hypothesis, the research project examines the heterogeneity in the effects of common determinants of their loan repayment between minority vs.