

18TH ANNUAL

# Graduate



# Multidisciplinary Conference

*An annual conference to showcase the research and projects of the Clark University and Worcester graduate student community.*

**FRIDAY, APRIL 22, 2022, 11:00 A.M -3:30 P.M.**

Shaich Family Alumni and Student Engagement Centre (ASEC),  
Board Room 202, Clark University, Worcester, MA 01610



## MULTIDISCIPLINARY CONFERENCE PROGRAM

A conference to celebrate the contributions of graduate students from Clark University to the academic community. Multidisciplinary Conference is a platform to learn about the ideas and methods unique to each of the many fields encompassed by graduate research. The mission of the Multidisciplinary Conference is to give students a broad perspective on academic research, as well as to offer the graduate community the experience of communicating their findings to a diverse academic audience.

**11:00 am - 11:40 am Opening and Keynote Address**

**11:40 am – 12:00 pm Oral Session**

**12:00 pm – 12:30 pm Lunch Break & Networking**

**12:30 pm – 12:50 pm Oral Session**

**12:50 pm – 01:30 pm Poster Presentation**

**01:30 pm – 02:50 pm Oral Session**

**Friday, April 22, 2022. 11:00 am. - 3:30 pm.**

*Shaich Family Alumni and Student Engagement Centre (ASEC), Board Room 202, Clark University, Worcester, MA 01610*

## CONFERENCE OPENING ADDRESS



### **David Fithian**

*David Fithian '87, a proud alumnus and a distinguished leader in the world of higher education, was named the president of Clark University in January 2020, only the 10th person to hold the position since the University was founded in 1887. B.A., Clark University, 1987; M.A., Yale University, 1988; M. PHIL, Yale University, 1990; Ph.D., Yale University, 1994.*

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## CONFERENCE INAUGURAL SPEECH



**Yuko Aoyama**  
*Associate Provost and Dean of Research and Graduate Studies.*

*Professor, Graduate School of Geography at Clark University. B.A., International Christian University, Tokyo, 1986; M.A., University of California, Los Angeles, 1990; Ph.D., University of California, Berkeley, 1996.*

## CONFERENCE KEYNOTE SPEAKER



**David Chearo**  
*Vice President for Planning and Strategic Initiatives at Clark University. B.A., University of Illinois, 2006; M.A., University of Chicago.*

## ORAL PRESENTATIONS: SESSION A

*Schaich Family Alumni and Student Engagement Center, Board Room 202, Clark University*

### I. PRESENTER: ROBERT KEARNEY (11:40 am)

*Department: Masters in Geographic Information Science*

Statement: In April 2021, I began my research assistantship for Dr. Florencia Sangermano and the Graduate School of Geography at Clark University. My role was to assist in the

deployment of passive audio recording devices in State Forests in Central Massachusetts and development of a spatial database for the analysis of landscape acoustics. Between April and December 2021, each of the twelve survey locations were visited three times for a total of 36 site visits. The three site visits included the initial device deployment (April 2021), battery and memory card replacement (July 2021), and device retrieval (December 2021). In addition to the deployment of recording devices in central Massachusetts I was also responsible for spatial database development for the subsequent analysis of landscape acoustics. Spatial datasets were compiled from numerous state and federal government sources and include both vector and raster file formats. All datasets reside within an ESRI file geodatabase with associated metadata documentation. This experience has taught me about conducting field work, spatial database development, and metadata documentation. I intend to use these and other valuable skills gained from the Graduate School of Geography at Clark University in future conservation GIS projects.

## LUNCH AND NETWORKING BREAK (12:00 pm to 12:30 pm)

### II. PRESENTER: KALYAN GAVINI (12:30 pm)

*Department: Cybersecurity*

Statement: This presentation is about the Healthcare Industry's vulnerability towards ransomware. Ransomware is a type of malware that access the effected system or data and locks it using encryption techniques and will not release it until demanded ransom is paid. It continues to be a major threat that causes heavy damage to the organization's brand value. When the critical data is locked, it disrupts or halts their operations. In some cases, the attackers steal the organizations critical and confidential information and demand additional payment to not disclose the information. In this presentation, the reasons why healthcare industry has become a soft target is discussed. Few statistics and recent incidents are also included.

## POSTER PRESENTATION

### III. PRESENTER: BRETT IARROBINO (12:50 pm)

*Department: Master of Arts (M.A.) in teaching candidate with the Adam Institute for Urban Teaching and School Practice.*

Statement and abstract: Diverse young adult literature is a

much educational and representational respites for marginalized students as much as they are currently vilified by state legislatures across the country. What constitutes diverse; and contemporary in today's literary world, and why are certain political institutions and cultural hegemonies threatened by their presence in the American classroom? What does the literature belonging to these categories reveal about the



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restorative power of representation and equity when teaching English Language Arts? And how does this diversification of our literary canon and means of education strike down and dispel controversial myths about teaching identity-based subject matter or social justice issues? These inquiries were explored through in-person daily teaching and youth work, made possible by the Adam Institute for Urban Teaching and School Practice and the University Park Campus School, an innovative product of Clark University's long-standing partnership with Worcester Public Schools. Supported by supplemental research and scholarship conducted in the graduate classroom under the supervision of Dr. Rosa Nam, my research asserts the unique advantage and productivity exerted by diverse contemporary YA literature's presence in the secondary English classroom, interpolating anonymous student written work to expand on the personal connections and lived experiences safely scaffolded by the teaching, facilitation, and exploration of such texts.

#### IV. PRESENTER: ARIANE BORGES (1:10 pm)

**Department: Biochemistry and molecular biology** Abstract: Protein-protein interactions (PPI) are essential for cell signaling pathways. Mutations on proteins involved in PPI are hallmarks of different cancers, hence there is an increasing interest in inhibiting protein-protein interactions between oncogenic proteins. KRas is involved in cell signaling pathways that control cell growth, proliferation, and apoptosis. K-Ras is part of the Ras family of proteins, and it gets activated by SOS. Various cancers have shown mutations of different residues on K-Ras protein, and the most recent approach of inhibition is by inhibiting interaction between K-Ras and SOS. Our main goal in the Nag lab is to use Chemical Epitope Targeting technology to inhibit the interaction between K-Ras, KRas(G12V), and its GEF, SOS. This project focused on the preliminary studies necessary to develop a tetrazine-cyclized peptide library that will be used to screen for inhibition of KRAS-Sos interaction. In addition, we also explored the linearization and cleavage of a peptide from the solid support to facilitate the sequencing. The tetrazinecyclized peptide library was generated by synthesis via standard solid-phase synthesis using Fmoc-protected amino acids on tentagel resin. Our previous studies showed that removal of Mmt protecting group followed by tetrazine cyclization yielded better results. Therefore, peptides containing Cys-Mmt protecting group were deprotected using a modified protocol and cyclized using dichlorotetrazine; the results showed tetrazine-cyclized peptides were the main product. Lastly, peptides of general sequence Ac-NH-X5(CX4X3X2C) TetzX1-ANPTG were exposed to 365 nm and 310 nm UV irradiation resulting in ANP and tetrazine cleavage respectively.

## ORAL PRESENTATIONS: SESSION B

#### V. PRESENTER: MICHAEL CECIL (1:30 pm)

**Department: Geography**

Abstract: Cloud cover remains a fundamental obstacle to satellite-based remote sensing, especially in tropical and subtropical areas with prolonged rainy seasons. Ground-based multispectral sensors allow for monitoring of crop phenology at daily and hourly intervals, regardless of cloud cover, but can only sense within a limited radius. This paper examines how crop phenology curves from time-dense ground sensors can potentially fill gaps in satellite-based time-series. A key question is how well satellite imagery, including multi-spectral and radar, can model ground-measured surface reflectance at locations where pods are not present. This estimation model can take both parametric and non-parametric forms, and this paper will discuss the data needs and advantages of each type of model.

#### VI. PRESENTER: ELLIE BEARGEON (1:50 pm)

**Department: International Development, Gender and Sexuality Studies, Sociology**

Abstract: This thesis explores the lived experiences of U.S. LGBTQ-identifying military service members and veterans after the abolition of the U.S. government's Department of Defense policy 'Don't Ask, Don't Tell' in September of 2011 through a series of qualitative interviews and analysis of U.S. and international military recruitment materials. The research determines that LGBTQ folks have been increasingly placed in the crosshairs of U.S. military recruitment strategies from 2011-2021 in accordance with a broader trend among internationally military forces that have recently adopted variations of homo nationalistic rhetoric by portraying a diverse fighting force as a critical foundation for a lethal and effective military. Additionally, it examines the constructions and reproductions of gender and identity in both U.S. and international militaries, specifically in the form of the perpetuation of the 'warrior' or 'warfighter' archetype, an archetype that idealizes masculine glory and honor. As a lesbian and U.S. Army war veteran, the researcher reflectively utilizes her positionality to contribute to the ongoing development of new understandings of modern military recruiting strategies, militarized gender and sexuality norms, and individual servicemembers' conceptualizations of both queer and military identity in relation to their military service. Ultimately, this thesis demonstrates the intimate ways in which today's U.S. LGBTQ identifying military servicemembers engage with, identify with, and resist current recruitment strategies and evolving gender and warrior archetypes.

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## VII. PRESENTER: NAYANTARA BISWAS (2:10 pm)

*Department: Economics*

**Abstract:** This paper examines the effect of the extension of a large-scale conditional cash transfer program implemented by the National Health Mission on maternal health outcomes in India. I look at the supply-side of this policy by exploiting the variations in time and district-level program intensity across the targeted population. I apply a difference-in-differences strategy by using data from the second and fourth phases of the District Level Household & Facility Survey and exploit the variation in the number of healthcare workers, introduced by the policy, over time. I find that the policy made women from poorer households better off in terms of accessing various healthcare services, such as antenatal care, and immunization and brought about a fall in the fertility trends of women living in a district with more community health workers, in the long term.

## VIII. VIRTUAL PRESENTER: DAAN DE LEEUW (2:30 pm)

**Abstract:** After people had been deported from their home countries to concentration and death camps, the Germans transported prisoners selected for forced and slave labor to places where the war industry needed them. The movement of Jewish slave laborers from camp to camp was a central feature of the Holocaust. Each relocation shattered the prisoners' networks and social structure as it affected the bonds that inmates created among themselves. This type of forced movement was pervasive, yet scholars have hardly scrutinized it. In this paper I will analyze the daily lives of Jewish slave laborers, tracing their trajectories through the concentration camp system in the latter half of World War II. My starting point will be various deportations of Dutch Jews from Judendurchangslager Westerbork to concentration and death camps in Germany and Nazi-occupied Poland. I will follow some twenty Jewish deportees of several transports and map their routes through the camp system. Drawing upon wartime and postwar documents and survivor testimonies, I will reconstruct and visualize their pathways and experiences through geographic information system (GIS) and manual cartography. In addition, I will address how chance, luck, and fortuitous circumstances shaped inmates' pathways, social relations, and ultimately, their survival.

## IX. PRESENTER: ANIKA WOHLLEBEN (2:50 pm)

*Department: Biology*

**Abstract:** Parasite burdens often vary substantially between host populations, both on spatial (globally and locally) and temporal scales. In this study, we took advantage of the *Gasterosteus aculeatus* (three spine stickleback) – *Schistocephalus solidus* host-parasite system to answer questions regarding the timing of infection and parasite burden in different host populations. Following the last glacial maximum, when oceanic stickleback independently colonized freshwater habitats, they first encountered *S. solidus*, a tropically transmitted cestode with a

long history of parasitizing freshwater stickleback. Adapting to this new freshwater environment and parasite pressure, some stickleback populations evolved to have persistently low parasite loads, while other populations evolved to have consistently high loads or extreme fluctuations in parasite loads across years. With the timing of infections being of great importance in host-parasite interactions and co-evolution, we investigated the timing of infection by *S. solidus* in four Alaskan stickleback population with different *S. solidus* infection rates. Our goal was to see if young-of-year stickleback, having hatched within the last few months, were already be infected with *S. solidus* and if so, to determine the development of the infection over the winter. We chose host populations with either high or low adult infection rates and were interested, if these differences would already be detectable in young-of-year fish. We found young-of-year stickleback harbored *S. solidus* parasites, with infection rates differing between the host populations: Depending on the year, the infection rate in young-of-year stickleback was between 10-20% for the low infection population and between 30-70% for the high infection populations. For the 2019 cohort, infection rate increased dramatically over the winter, while it did not change in the 2018 cohort. This study leads to two conclusions: First, *S. solidus* infecting young-of-year stickleback find themselves in hosts that are too small for the parasite. The parasite must allow it's hosts to grow after infection, or the parasite won't be able to reach its definitive size and with that sexual maturity. Second, infections seem to continue under the ice cover.