Oral Presentation Abstracts

LANGUAGES, LITERATURES, AND CULTURES

EXPRESSING TRAUMA THROUGH GRAPHIC NARRATIVE IN JOE SACCO'S PALESTINE

Presenter(s):   Prieto-Montero, Ángel, Graduate, Languages, Literatures, & Cultures
Mentor: Dr. Jonathan Druker

This paper discusses how Joe Sacco's Palestine represents the traumas of the Israeli-Palestinian conflict through the art of the graphic narrative. With his nuanced combination of journalism and comics, of words and images, Sacco provides a unique lens through which to engage Western audiences in the multifaceted and often overlooked aspects of trauma in this longstanding conflict. His graphic narrative visualizes the structural and historical traumas faced by Palestinians, especially in the aftermath of the Nakba, and is a powerful tool for shedding light on individual and collective experiences and conveying the realities of trauma in the Israeli-Palestinian context.

This analysis examines Saccos visual strategies, including spatial representations, color usage, and framing, arguing that these elements contribute to the creation of a vivid and emotionally resonant portrayal of trauma. Furthermore, this paper underscores how Sacco challenges Western perceptions of the conflict by presenting a more comprehensive understanding of the Palestinian experience. It becomes evident that Sacco's immersive style transforms readers into observers of the disaster, fostering a humanizing perspective on the Palestinians.

REPRESENTATIONS OF TRAUMA IN PERUVIAN CINEMA: AN ANALYSIS OF THE MOVIE "THE MILK OF SORROW" BY CLAUDIA LLOSA

Presenter(s):   Serna Maldonado, Yaritza, Graduate, Languages, Literatures, and Cultures
Mentor: Dr. Jonathan Druker

My presentation will examine Claudia Llosa's film, The Milk of Sorrow (2009), within the framework of trauma theory. I will propose that the film, set in the 1980s, portrays historical, transgenerational, and insidious trauma, and aim to explore how these themes are represented in the movie and how they affect the characters. Through the analysis of the film's portrayal of trauma, I will provide insights around the impact of traumatic experiences on Peruvian indigenous communities affected during Peruvian civil war.

MINIMA HOPING FOR REDUNDANTLY LARGE NEURAL NETWORKS

Presenter(s):   Achammer, Chris, Undergraduate, Physics
Mentor: Dr. Rainer Grobe
Co-Mentor: Dr. Q. Charles Su
Authorship: Chris Achammer, Harrison Smith, R. Grobe, and Q. Charles Su

The minimization of the loss function in a highly dimensional search space is the central challenge in all neural network applications. Here, the space of the unknown parameters is typically very large, which can lead to multiple minima associated with the same value of the loss function. This problem of non-uniqueness is especially challenging if the neural network has a higher number of neurons than is actually required. We will discuss the resulting phenomenon of minimum hoping and illustrate it for simple function matching based on the binary sigmoid activation function. We acknowledge NSF support.

SOLVING DIFFERENTIAL EQUATIONS WITH NEURAL NETWORKS

Presenter(s):   Achammer, Chris, Undergraduate, Physics
Mentor: Dr. Rainer Grobe
Co-Mentor: Dr. Q. Charles Su

The conventional methods of solving ordinary differential equations (ODEs) and partial differential equations (PDEs) are usually limited in spatial and CPU time due to the increase in dimensionality. However, such difficulties might be overcome with the help of neural network algorithms. In this presentation, we illustrate how simple ODEs and PDEs can be solved with this new technique. We acknowledge NSF support.

EFFECTS OF SPECTRAL PHASE PULSE SHAPING ON ATTOSECOND PROCESSES

Presenter(s):   Aygun, James, Undergraduate, Physics
Mentor: Dr. Allison Harris

The recent development of attosecond pulses has allowed for the ability to probe the dynamics of electrons in the atom. Two important processes in Attosecond science are high-order harmonic generation (HHG) and attosecond energy streaking. During the HHG process, an intense laser pulse tunnel ionizes an electron, after which the electron moves in the laser field, and eventually recombines with the atom. Recombination results in light of harmonic frequencies of the laser field being emitted. Better control of attosecond processes is desirable and one such possibility for this control is through the use of structured laser pulses, such as Airy pulses.

During the streaking process, an atom in a low intensity, low frequency laser field (the streaking field) is ionized by a high frequency attosecond pulse. Following ionization, the photoelectron moves in the presence of the streaking field with its momentum is determined by the streaking field's vector potential at the time of ionization. By changing the relative delay between the attosecond ionizing pulse and the streaking field, the time required for the photoionization process can be determined.

Both HHG and attosecond energy streaking are important processes in attosecond physics. HHG is used to produce ultrashort XUV pulses that can be used to study electron dynamics through processes such as streaking. Better control of the HHG process is desirable and one such possibility for this control is through the use of structured laser pulses, such as Airy pulses. We present numerical results for solving the 1D time-dependent Schrödinger equation for HHG from hydrogen using Airy and Gaussian pulses and show that differences in the harmonic spectrum, emission times, and state populations are observed for Airy pulses compared to Gaussian pulses. We then use attosecond energy streaking to determine if the ionization time for structured Airy pulses is different than for Gaussian pulses. Combined, our results demonstrate that structured pulses alter the electron dynamics of attosecond processes and that they offer an additional means of control not attainable with traditional pulse profiles.

INHERITED LEARNING NEURAL NETWORK FOR QUANTUM FIELD THEORY

Presenter(s):   Czajka, Brendan, Undergraduate, Physics
Mentor: Dr. Rainer Grobe
Co-Mentor: Dr. Q. Charles Su

We introduce a neural network-based computational technique to study the strong-field-induced electron-positron pair creation process from the quantum vacuum state. In computational quantum field theory (CQFT), the fermionic vacuum is represented by the set of all negative energy eigenstates of the Dirac equation. To calculate the dynamical evolution of various positronic and electronic observables, each of these Dirac sea states needs to be evolved in time. In CQFT, these states are usually obtained independently as solutions to the time-dependent Dirac equation. We suggest that neural networks can be employed to learn from the time evolution of a single state and then use this gained information consecutively to accelerate the calculation speed of the other states. We acknowledge NSF support.

EFFICIENT DETERMINATION OF DIRAC SEA STATES

Presenter(s):   James, Eyan, Undergraduate, Physics
Mentor: Dr. Rainer Grobe
Co-Mentor: Dr. Q. Charles Su

Supercritical field-induced vacuum breakdown is a process that has attracted increasing interest due to advances in high-power laser technologies. The vacuum may be described as the occupied Dirac Sea states, serving as the initial state of quantum field theoretical calculations. The speedy and accurate determination of these states is obviously very desirable. Usually, this involves the diagonalization of a Hamiltonian, and with the Dirac Sea, the computation multiplies accordingly. In this work, we determine these states using neural networks. Additionally, we take advantage of the resemblance of nearby states to recover many Dirac states efficiently. We acknowledge NSF support.

COMPUTING 5-POINT CONSTRUCTIVE AMPLITUDES

Presenter(s):   Minney, Gabe, Undergraduate, Physics
Mentor: Dr. Neil Christensen

Recently, a complete set of 4-point amplitudes has been constructed and validated for the Standard Model. With this advancement, it is time to construct the 5-point amplitudes. In order to do this, we will create an algorithm for constructing the diagrams and expressing them mathematically. We will then output these diagrams to numerical code and compare with Feynman diagrams for the same amplitude. This will allow us to work out the currently unknown parts of the algorithm, generate novel amplitudes and compare the efficiency of constructive amplitudes with Feynman diagrams.

MUSICAL THEATER PRO-SHOTS: QUESTIONING AN ENTERTAINMENT INDUSTRY TREND

Presenter(s)   Dutra Guedes, Gustavo Nery, Graduate, Theatre and Dance
Mentor: Dr. Kee-Yoon Nahm
Authorship: Gustavo Nery Dutra Guedes

Since the early stages of the digital era, the theater industry has been concerned about how to document and broadcast its most popular shows. Professional recordings (known as "pro-shots") started to gain popularity by the 1980s; however, since the 2010s, the number of live musical theater professional recordings has been growing exponentially. This research intends to analyze the root of this trend by considering factors discussed by theater scholars, such as the practice of sharing bootleg recordings online; the popularity of some theater shows on social media; and the embracing of streaming services as a form of media consumption.

CAMUS'S ABSURD REBELLION WITHIN TOM STOPPARD'S *DOGG'S HAMLET, CAHOOT'S* MACBETH

Presenter(s)   Nance, M., Graduate, Theatre and Dance
Mentor: Dr. Derek Munson
Co-Mentor: Dr. Kee-Yoon Nahm

Martin Esslin's discussion of the "Theatre of the Absurd" offers an incomplete representation of the absurd in both its underlying philosophy and its influence on humanity at a societal level. Esslin based his writings on Albert Camus's The Myth of Sisyphus, which offers a more complete representation of the philosophy of the absurd when compared to Esslin's cursory attempt. Camus starts by describing the absurd as a conflict between man and the world around him. This conflict is born from the human urge to look for an intrinsic meaning, or cosmic justice, in a world that is actively hostile to humanity and its endeavor due to being void of any such meaning. Camus then argues that the solution to this conflict is not to give up but to persist, to keep living in spite of that conflict, as a form of rebellion. Camus's The Rebel expands his idea of the absurd rebellion into a communal experience that occurs when people are subjected to an unjust society, and he argues for revolution based on philosophy as a form of rebellion rather than violence. To examine the effectiveness of such a revolution, I will analyze an example of the absurd rebellion—Tom Stoppard's plays Dogg's Hamlet, Cahoot's Macbeth, which he wrote in response to the state sponsored censorship in Czechoslovakia during the twentieth century. Most critical discussions about these plays focus on analyses of Stoppard's use of Shakespeare's works within the plays while overlooking the plays' absurdist nature and historical context. This essay seeks to examine how Dogg's Hamlet, Cahoot's Macbeth can be viewed as a form of societal rebellion as argued by Camus.

THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND MENTAL HEALTH IN DUNCAN MACMILLIAN'S LUNGS

Presenter(s):   Phurahong, Phitsinee, Graduate, Theater and Dance
Mentor: Dr. Kee-Yoon Nahm

In this paper, I argue that in order to recognize the urgency of addressing climate change rather than perceive it as a distant issue, it is important to understand the relationship between climate change and mental health. Climate change is a pressing crisis of unparalleled urgency. Our planet is warming an alarming rate, causing extreme weather events, melting ice caps, rising sea levels, and irreversible ecosystem damage. Climate change can also impact our mental health, causing problems such as eco-anxiety, Pre-Traumatic Stress Disorder, Solastalgia, and Ecosickness. Furthermore, people may become overwhelmed, anxious, stressed, hopeless, or even depressed about the uncertain future, which can lead to inaction and thus worsen the climate emergency. How can theatre address this crisis while also bringing awareness to the significant impact that climate change can have on our mental health? The genre of eco-drama offers one solution. I will discuss Duncan Macmillan's 2011 eco-drama *Lungs*, which depicts a couple that wrestles with the dreadful decision of bringing a child into a deteriorating world. The play makes a symbolic connection between ecology and pregnancy by, for example, comparing global carbon emissions to the womb of a smoking mother. By highlighting the issues of overconsumption and the trade-off between personal choices, environmental concerns, and economic conditions, the play also shows that these problematic conditions are primarily rooted in capitalism, which is a significant factor contributing to the degradation of our environment, or what we can call home. By examining the play's symbols, I will explore the profound impact of climate change on individuals. I will also demonstrate that eco-drama can present issues of climate change from a more personal and immediate perspective; theatre allows us to better appreciate its impact on our own individual well-being. Using critical methods and the theory of cultural materialism, I will delve into how climate change impacts us, affecting our physical and mental well- being.