



United in Joy and Misery?

Investigating the Links From Collective Emotions to Team Integration



What is the problem?

Teams usually form to accomplish a particular task (Forsyth, 2010). Hence, we tend to evaluate them based on their performance and neglect their **social integration**, that is, the relational ties that bind members together and to their group, which form an important basis for team success as well as member well-being and flourishing (Jimmieson et al., 2010; Knight & Eisenkraft, 2015; Wolf et al., 2015). To enhance social integration, coaches and consultants can employ a variety of more or less complicated and time-consuming teambuilding methods. An

alternative and potentially more efficient way to foster social integration may lie in teams' recurring emotional experiences, specifically in the extent to which they experience **collective emotions**, that is, the same or similar emotional responses (von Scheve & Ismer, 2013). Although existing research suggests a positive link between collective emotions to team integration, we do not know whether this persists across manifestations of integration (e.g., member and team levels; cognitive, affective, and behavioral components) and emotional valence (e.g., collective happiness and collective sadness).

What am I trying to do?

In this project, I set out to provide more comprehensive insight into the **links from teams' collective emotions to their social integration** in a competitive sport setting **across cognitive, affective, and behavioral manifestations** of integration **at individual member and team levels**, and **for pleasant and unpleasant emotional valence**.



What is the point?



Once we know more about the links of collective emotions to social integration, we can research the causality of the relations and translate the findings to regulate and use teams' emotions in practical ways that foster social integration and, via this, sustainable member and team functioning. In particular, sport is more accessible to research than comparable high-pressure work settings (e.g., first responder teams, Special Forces). Yet, advances in a sport setting can be translated into these adjacent domains and used to retain member motivation and commitment, build team resilience, and ultimately optimize team performance therein as well.



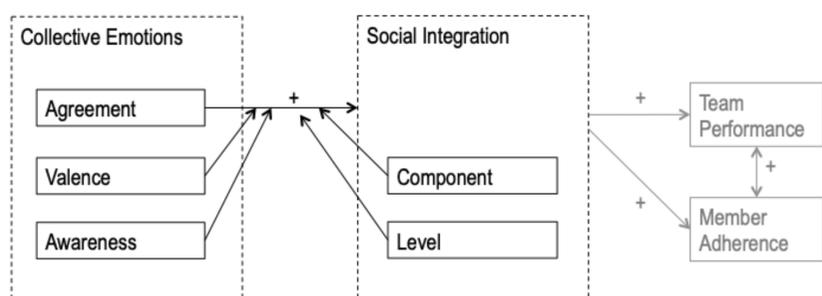
What are the challenges?

Because this project is a correlational field study and interested in member as well as team effects, we need to sample intact sport teams. In addition, because we want to investigate emotions, we need to collect data in situations that are important to athletes such as competitions. This means, we depend on teams' season calendars and availability.

What is the current state of the project?

We have obtained IRB approval and assembled the study materials, that is, letters of informed consent, team protocols (to collect demographic and performance data), and questionnaires (to probe athletes' emotions – unpleasant, pleasant, level of agreement; perceptions of social integration – cognitive, affective, behavioral components, member and team levels; and intention to return). We have also identified teams whom we will approach for recruitment.

Where do I go from here?



We are gearing up to contact teams and collect data during the upcoming fall season. On these data, we will then conduct a series of multilevel regression analyses capturing the conceptual model to the left. Based on the results of these analyses, we will then conduct further, more targeted field studies and laboratory or online experiments in which we manipulate collective emotions (e.g., type, level of agreement) and test their causal effects on social integration.

Dr. Svenja A. Wolf – Sport Psychology program – swolf2@fsu.edu

in collaboration with Dr. Dave Eccles and the Laboratory of Emotions in Groups and Organizations (LEGO)

*Illuminations: Poetic & Musical Links in Fauré's *La bonne chanson* & Britten's *Les Illuminations**

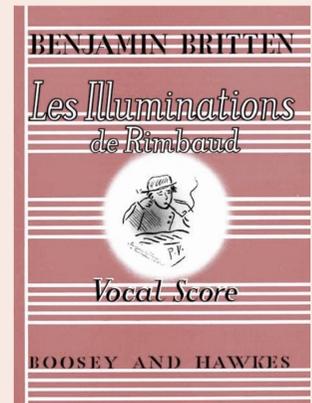


Introduction:

The project embarks on detailed study and preparation of two major song cycles for voice and piano for future performances: Gabriel Fauré's *La bonne chanson*, op. 61 (poetry of Paul Verlaine) and Benjamin Britten's *Les Illuminations*, op. 18 (poetry of Arthur Rimbaud).

While the compositions were separated by about a half century, Britten and Fauré selected poetry that was significantly linked. Rimbaud and Verlaine were lovers, and each demonstrated the influence of the other in their respective poetry. Additionally, Verlaine was responsible for the title of his protégé's final collection: *Illuminations*, the title Britten gave to his cycle. Interestingly, Britten used techniques that mirrored the Neoclassicism, restraint, and recurring motivic material present in Fauré's songs.

The combination of these works composes a full-length and thematically unified recital of art song. A main interpretive goal of the project will be to discover thematic poetic and musical relationships between the two cycles and to flesh them out into a variety of meaningful artistic choices for performance.



Results/Future Directions:

The project results in a unique performance program unified by many thematic relationships that will be illuminated clearly in live performance. The programming of all-French art song (*Mélodies*) recitals has become ever rarer in recent decades. Our work attempts to rejuvenate this beloved genre and has attracted the interest of several classical music presenters across the Northeast. A two-week spring tour has been booked with the internationally renowned pianist J.J. Penna, faculty of the New England Conservatory of Music and Yale School of Music (formerly The Juilliard School).



Gabriel Fauré (1845-1924)



Benjamin Britten (1913-1976)

Methods:

Context:

- Research historical, cultural, and political context of works
- Write detailed but brief program notes to guide audience

Text:

- Translate French text into English (word for word & poetic)
- Ensure accurate and expressive pronunciation of the French text
- Poetic scansion and other text analysis

Musical:

- Analyze melody, harmony, meter, rhythm, form, & texture
- Learn & internalize notes, rhythms, and harmonic context
- Collaborate with pianist remotely to make interpretive choices

Vocal:

- Apply vocal techniques that accommodate ideal tonal quality, flexibility, dynamic variety, articulation, efficiency, & expression

Dramatic:

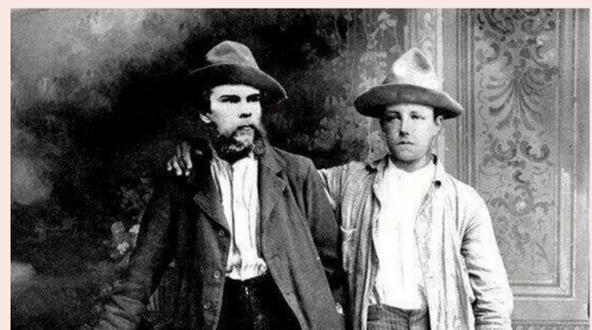
- Prepare dramatic presentation via subtext & character analysis

Synthesis:

- Analyze text/music relationship and internalize word meaning
- Memorize text, music, vocal techniques, and dramatic choices
- Synthesize methods & prepare a performance ready project

Spring 2022 Recital Tour

West Chester, PA: West Chester University	3/22
Allentown, PA: Muhlenberg College	3/23
New Brunswick, NJ: Rutgers University	3/25
Trenton, NJ: Capital Singers Trenton	3/27
Boston, MA: House Concert	3/29
Providence, RI: The Music Mansion	3/30
Harrisburg, PA: Music at Pine Street	4/01
Pittsburgh, PA: Music in a Great Space	4/03



Paul Verlaine (1844-1896) & Arthur Rimbaud (1854-1891)



Dr. Eric Rieger

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Effects of elastic band resistance training on inflammation, physical function, and quality of life in women with heart failure with preserved ejection fraction

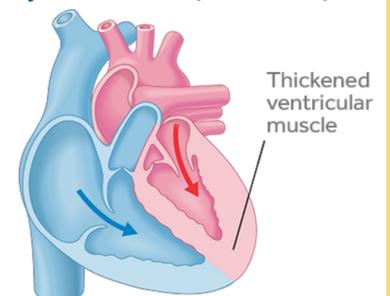


Mia Newlin-Bradner, PhD, MSN, RN
College of Nursing

Study Overview

- Heart failure with preserved ejection fraction (HFpEF) is a chronic disease common in women aged 65 years and older.
- Chronic inflammation has been shown to play a role in the development and progression of HFpEF.
- Pharmacological treatments that are effective in the management of HFrEF have not shown the same effectiveness in HFpEF, thus additional strategies for management are being explored.
- Exercise has been suggested as one potential strategy due to its' effects on systemic inflammation, and its' overall improvement of quality of life in heart failure patients.
- Resistance training (RT) using elastic bands and telehealth instruction is an exercise modality that is low cost and convenient.

Heart failure with preserved ejection fraction (Diastolic HF)



The left ventricle becomes stiff and does not relax normally. As a result, it cannot fill properly, and pressure begins to increase in the left heart chambers and in the lungs.
Retrieved from:
<https://www.cardiolrx.com/our-focus/heart-failure/>

Study Question

Will a 12-week home-based resistance training program using elastic resistance bands improve quality of life, physical function and systemic inflammation in women with HFpEF?

Methodology

Design: Pre-post intervention study design

Participants:

- Females age ≥ 55 years of age;
- CHF diagnosis > 1 month with stable drug therapy,
- New York Heart Association Functional Class of II or III and a left ventricular ejection fraction $> 50\%$;
- Nonsmoker;
- Not participating in an RT program in the past 3 months.



Visit 1

- Informed Consent
- Medical Records Authorization Form
- Kansas City Cardiomyopathy Questionnaire- Short Form
- MD approval Form

Visit 2

- Vital signs
- Height, weight, body composition
- Blood draw for analysis of C-reactive protein, Interleukin-6 and Tumor Necrosis Factor alpha;
- Senior Fitness Test

Visit 3

- Videoconference guided first resistance training session

Intervention

- Structured RT using elastic resistance bands 3 times per week over 12 weeks.
- Participants are contacted bi-weekly to answer questions and progress the exercise program.

Visit 4

- Vital signs
- Height, weight, body composition
- Blood draw for analysis of C-reactive protein, Interleukin-6 and Tumor Necrosis Factor alpha;
- Senior Fitness Test

Progress Thus Far

Due to several delays relating to the Covid-19 pandemic and necessary modifications to the original recruitment plan involving a partner site, recruitment has only recently begun. Currently modifications have been submitted to the IRB of record to expand recruitment efforts to additional sites.

Next Steps

Recruitment will continue to obtain the necessary number of participants.

Analysis of pre and post test data to determine if there are significant improvements resulting from the intervention.



For more information contact: Dr. Mia Newlin-Bradner, PhD, RN, MSN
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scan me



Does Partisan Politics Affect Individuals' Investment Choices?

Hosein Maleki, Department of Finance

Background and Motivation

Over the past few decades, the U.S. media has gone through a sharp increase in ideological divide. Research shows that exposure to slanted, partisan media affects the actions of voters and politicians and is deemed as one of the main drivers of the dramatic surge in political polarization in the U.S. The effect of partisan beliefs goes well beyond politics, however, its effects on the economy have remained largely unexplored. In this research, we ask whether partisan media affects individuals' behaviors in the financial markets and especially, whether it affects their investment decisions.

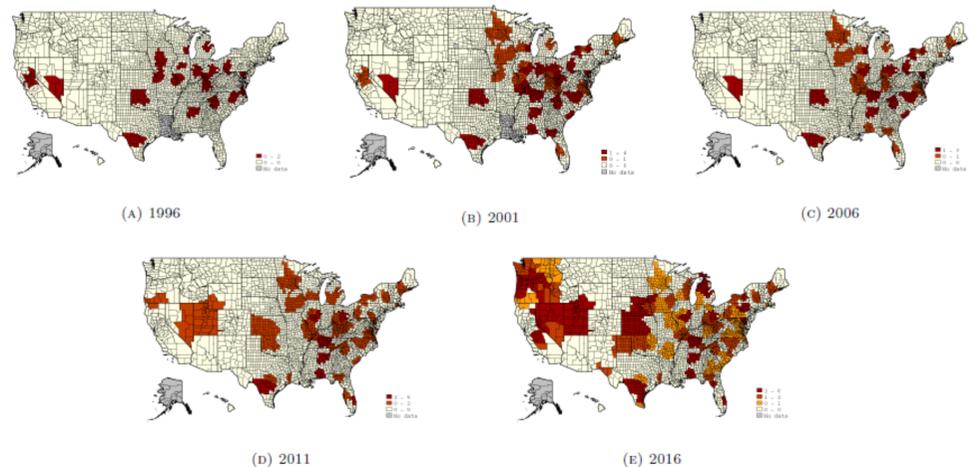
Proposed Method

To identify the effect of partisan ideologies, we examine whether exposure to conservative media influences fund managers' investments in socially responsible firms, i.e., firms with high corporate social responsibility (CSR, hereafter) rankings. This choice is due to recent literature that shows CSR activities are influenced by political motives and ideologies. We specifically focus on the staggered expansion of Sinclair Broadcasting Network to local TV markets over 1996 to 2016, and measure the investment behavior of fund managers, pre- and post-exposure.

Data

The data are obtained from a variety of sources, including Kinder, Lydenberg, Domini (KLD) for companies' CSR rankings; Federal Communication Commission for information on TV networks; Thompson Financial Database for mutual funds' holding; SEC Edgar for Sinclair Broadcasting Group's 10-Ks filings; and Census Bureau for county-level demographics, among other sources.

THE DISTRIBUTION OF SINCLAIR TV STATIONS BY COUNTY



Empirical Setting

We estimate the following model:

$$R_{it} = \alpha_i + \alpha_{st} + \beta \text{Sinclair TV}_{it-1} + \gamma X_{it-1} + \epsilon_{it}$$

where i , s and t indicate *fund*, *state* and *year*, respectively.

Results:

The graph above provides 5-year snapshots of Sinclair expansion across the U.S. We find that a major driver of Sinclair entry into a TV market is its population size. After Sinclair entry, fund holdings in the exposed regions shift significantly to industries with lower CSR rankings. The share of tobacco, guns and defense, and natural resource industries also increases. (See table below.)

	<i>PSI1</i>	<i>PSI2</i>	<i>AveCSR</i>	<i>Ave.CSR (FF)</i>
<i>Sinclair Entry</i>	0.006*** (0.002)	0.007*** (0.005)	-0.031* (0.056)	-0.034* (0.057)
<i>Log Size, Fund</i>	0.000 (0.896)	-0.000 (0.672)	-0.001 (0.779)	0.007 (0.237)
<i>Log Size, Fund Family</i>	-0.000 (0.526)	-0.000 (0.885)	0.004 (0.502)	0.000 (0.996)
Time fixed effects (date)	Yes	Yes	Yes	Yes
Fund fixed effects	Yes	Yes	Yes	Yes
Observations	35,330	35,330	31,180	27,665
Adjusted <i>R</i> -squared	0.516	0.493	0.403	0.410

Conclusion

We document that partisan ideologies matter for investment decisions. Specifically, fund managers alter their holdings after exposure to slanted/ partisan media messaging. In upcoming steps, we will explore possible mechanisms in detail and examine the robustness of the results.

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Motivations and Intentionality in the Arts Portfolio Career

Background

Many visual and performing artists working in the United States engage in portfolio careers and do not hold one single job with one employer (Bartleet et al., 2019; Bridgstock & Cunningham, 2016; citation). There are numerous definitions of a portfolio career provided in prior research. These definitions revolve around holding numerous concurrent jobs, the lack of a single employer, being self-employed and self-managed (Bartleet et al., 2019; Bartleet et al., 2012; Bennett & Bridgstock, 2015; Bridgstock & Cunningham, 2016; Myers, 2007). In this research, I define a portfolio career as holding multiple overlapping jobs in the arts as opposed to having a single full-time job with one employer. It often includes self-employed work. It might include a full-time position in addition to freelance work and may include some work outside of the arts. While previous research does indicate that many artists engage in a portfolio career, there is a lack of detailed data regarding the jobs that make up the portfolio career and how artists go about constructing a portfolio career.

Purpose & Research Questions

The purpose of this research was to investigate the process of how visual and performing artists construct a meaningful portfolio career and whether they see the portfolio career as a way to minimize risk as organizational behavior literature presents it. The research questions include:

- What types of jobs make up an artist's portfolio career?
- What factors do artists take into consideration when deciding what work to accept or decline?
- Do artists consider a portfolio career with multiple employers to be more secure than one full-time job with one single employer?
- Do artists engage in portfolio careers out of necessity or by choice?

Findings

The survey was completed by 122 individuals who identified as having arts portfolio careers. The majority of respondents (62%) had portfolio careers that were 100% made up of arts related jobs. Thirty-two percent maintained a full-time job in addition to their project-based work. Of this, 79% stated that their full-time job was arts related.

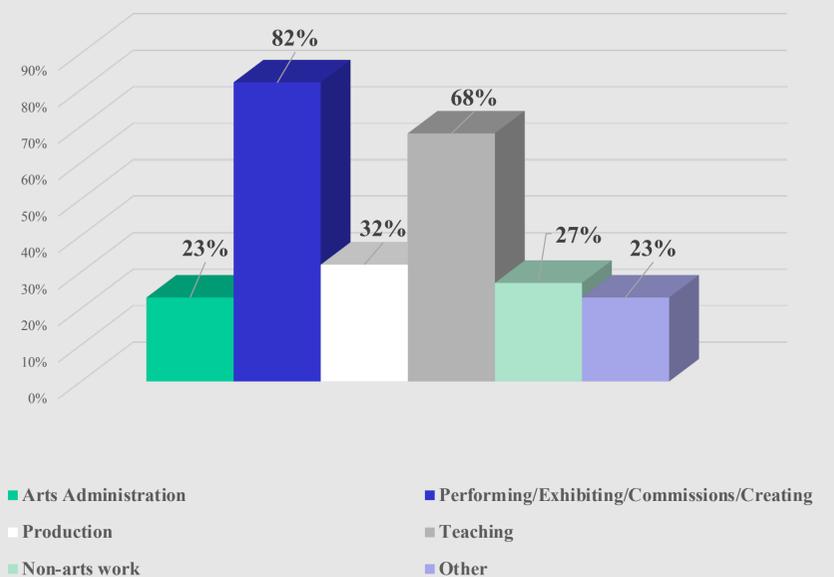
Creative activity including performing, exhibiting and creating was the most common type of work found in the participants' portfolio careers followed by teaching. These two categories were also identified as the type of work that made up the two largest portions of the portfolio careers. When asked what factors they consider when deciding what arts specific work to accept or decline, artistic fulfillment was the most commonly selected choice with 92% of participants selecting it followed by time commitment/schedule with 85% and payment with 82% selecting these options. Artistic fulfillment was identified as the most important factor with 42% selecting it. Both time commitment/schedule and payment were identified as the most important factor by 25% of respondents.

When asked if they thought intentionally about the type of work that makes up their portfolio career, 70% answered "always" and 28% answered "sometimes." Respondents were asked if they perceived having a portfolio career with multiple employers to be more secure than having one full-time job with one employer. Forty-nine percent felt it was less secure, while 18% felt it was more secure and 17% felt it was the same. Responses were divided when asked if having multiple employers minimizes financial risk with 37% selecting "yes" and 39% selecting "no." The remainder were unsure. When asked if they engaged in a portfolio career by choice or necessity, 33% selected "by choice," 24% selected "necessity," and 39% selected "both." The remainder were unsure.

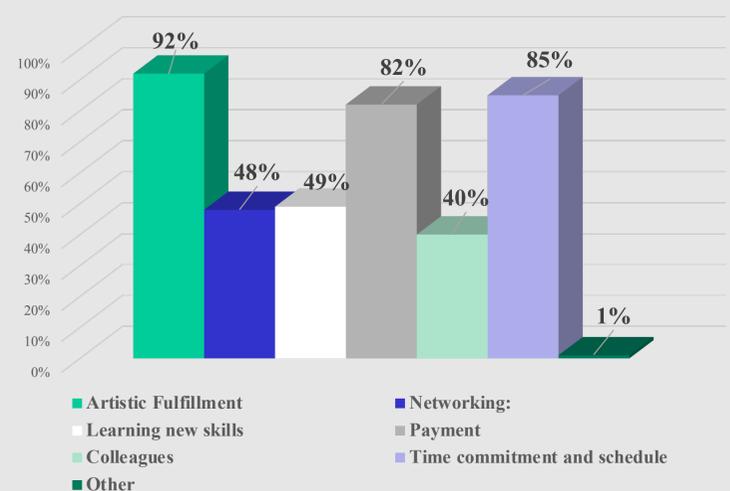
Next Steps

Next steps include expanding the data to include a larger number of participants. This would allow for comparisons to be made among different arts disciplines and to see if there are any trends by arts discipline. Qualitative data was also collected as part of this project. My goal is to write a second article using the qualitative data, which focuses on what artists find most satisfying and least satisfying about their portfolio careers.

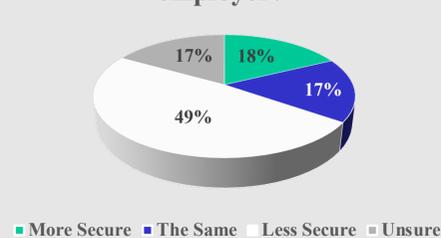
What types of work make up your portfolio career?



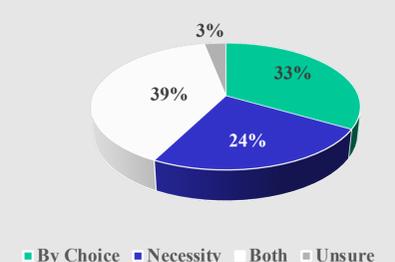
What factors do you consider when deciding what arts specific work to accept or decline?



Do you consider a portfolio career with multiple employers more secure than having a full-time job with one single employer?



Do you engage in a portfolio career by choice or necessity?



References

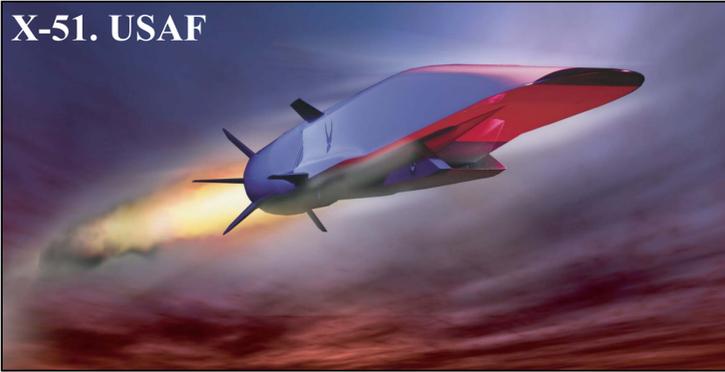
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WHAT IS THIS RESEARCH ABOUT?

Hypersonics: Faster than 5 X sound speed

- A \$3.6 billion annual problem for Pentagon
- \$15 billion+ 5-year expenditure plan for DoD agencies
- \$100 million plan for university consortium

X-51. USAF



- Faster travel - civilian and military transport
- Evade air defense systems, rapid delivery of payloads
- Access time critical targets from standoff distances
- Advance next-generation aerodynamic tech

WHAT PROBLEMS ARE WE SOLVING?

Concept art: Raytheon



Air-Surface interaction

- When high-speed air flows over the vehicle surface, it "trips" or "transitions" from a laminar to turbulent state
- Induces extreme friction on aerodynamic surface

$$\text{TRANSITION} = \text{HEATING} + \text{DRAG} \text{ PENALTY ON THE VEHICLE}$$

WE NEED EFFICIENT **COMPUTATIONAL TOOLS** TO **PREDICT** TRANSITION AND **QUANTIFY** ITS IMPACT

TRANSITION SIMULATORS THAT REDUCE TURN AROUND TIME – OUR SOLUTION

EXPLOIT **TWO** KEY FEATURES OF **HYPERSONIC FLIGHTS**

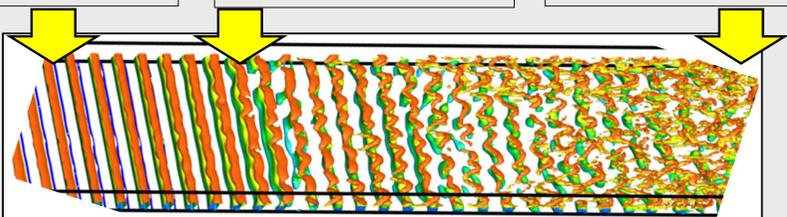


Source: Boeing

- Flight occurs in **QUIET** environment
- Atmosphere is mostly quiescent fluid

INCOMING AIR FLOW (FREESTREAM)

Laminar flow Transitional flow Turbulent flow



- Transition is induced by 2D disturbances
- Helps simplify the mathematical equations

APPLY NEWTON'S LAWS OF MOTION TO A **HYPERSONIC FLUID**

OBTAIN 3D NAVIER-STOKES EQUATIONS **COMPLEX GOVERNING EQUATIONS EXPENSIVE TO SIMULATE**

"DECLUTTER" THE GOVERNING EQUATIONS UTILIZE THE **SIMPLIFYING** FEATURES SHOWN ON THE LEFT

OBTAIN THE SIMPLIFIED "AXISYMMETRIC" 2D **HYPERSONIC EQUATIONS** **EASY TO SOLVE**

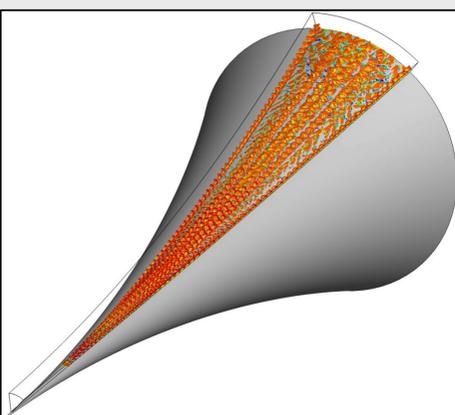
DEVELOP A PARALLEL **HYPERSONIC PDE SIMULATOR** IN FORTRAN

PERFORM **HYPERSONIC SIMULATIONS** ON FSU - RCC CLUSTER

OBTAIN **FAST TRANSITION PREDICTIONS** FOR RELEVANT VEHICLE DESIGNS

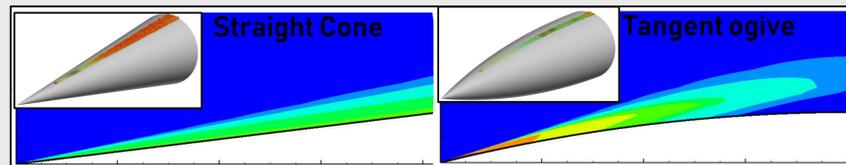
RESULTS: HOW DOES THE NEW TOOL COMPARE AGAINST THE "COMPLEX" APPROACH?

AN **"EXPENSIVE"** 3D SIMULATION

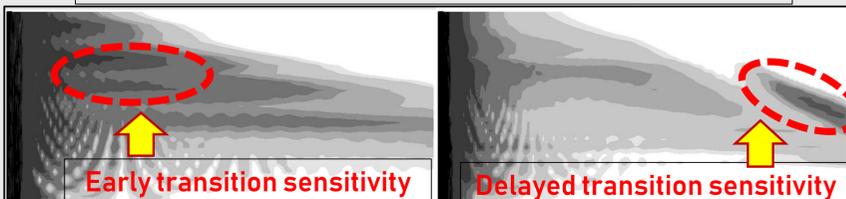


- Consumes over 200 hours of computations
- Just one "data-point"
- Parametric variations impractical

THE **SIMPLIFIED** 2D SIMULATION OF TRANSITION OVER **HYPERSONIC FOREBODIES**



Possible locations for transition on the two geometries

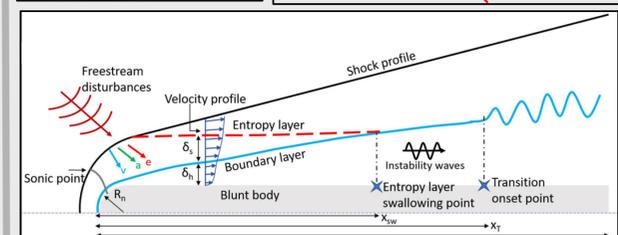
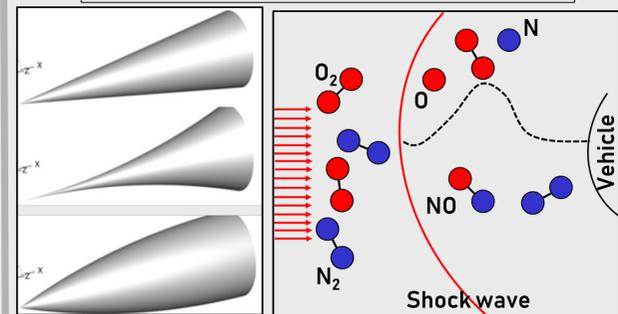


- < 10 hours of computations
- Enables comparison of multiple candidate geometries
- Several transition possibilities simultaneously evaluated

GOING AHEAD ...

SENSITIVITIES OF TRANSITION MECHANISMS TO:

- Surface curvature/geometry
- Non-equilibrium processes
- Impact of nose-bluntness



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The Interlocutor

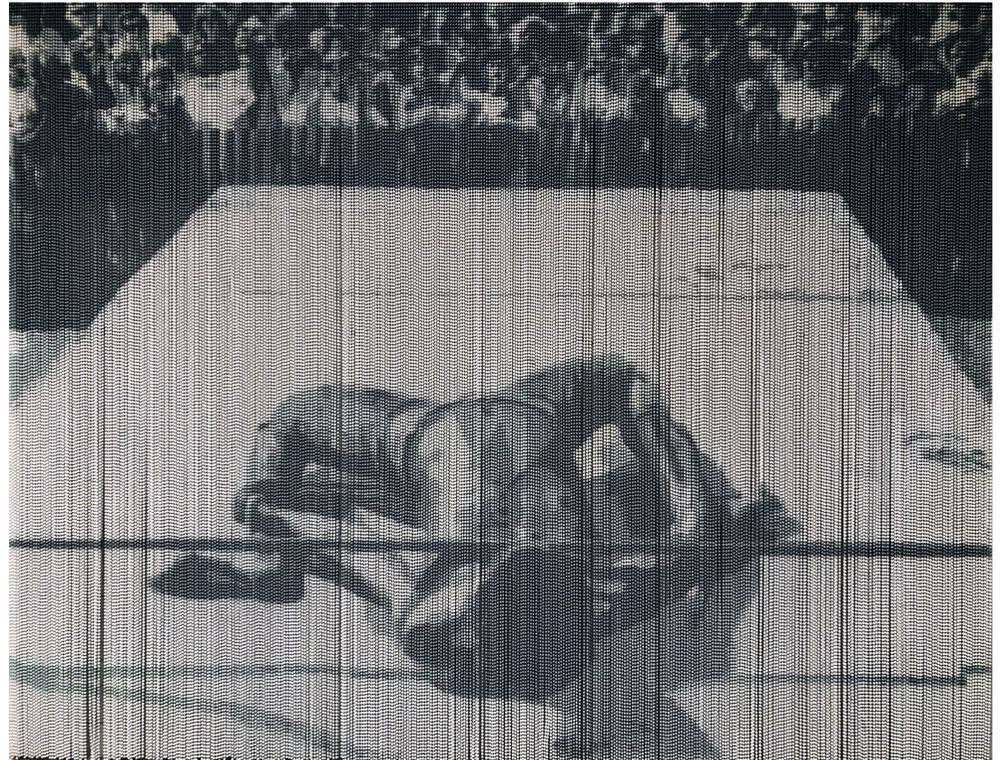
With the support of the FYAP grant, Cosmo Whyte created a series of drawings and a large-scale, hand-painted bead curtain (see image), each of which is based on archival photographs. The image reproduced on the beaded curtain (entitled 'The Interlocutor') was originally published in 1967 in the Toronto Star and captioned:

“Canada—January 16: Limbo Dancer thrilled thousands of Toronto citizens during Caribana '67 on the Island. But West Indians don't always get applause here—some have been unable to find a job for up to a year at a time.”

Exhibited in the context of New Orleans, the subject of the 10ft wide by 8ft tall painting gestures toward the voyeuristic consumption of “authentic” Black dance, music, and other forms of cultural production perpetuated in the tourism and service economies.

The beaded painting will be installed at the entrance to exhibition spaces inviting viewers to walk through and have a tactile experience. Moving through the beads viewers will activate the static historical image, a gesture of pixilation, disruption and deconstruction, implicating the audience as more than mere spectators.

Thank you to the FYAP grant for making this possible.



These works will be exhibited at the New Orleans Contemporary Art Center for the triannual exhibition Prospect.5 from 10/24/21 to 1/24/22.

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The Effect of Public Diplomacy on Foreign Public Opinion



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Does Public Diplomacy Matter?

Although leaders invest significant resources in foreign public outreach, many scholars dismiss public diplomacy as “cheap talk.” Can leaders influence foreign public opinion with high-level diplomatic visits, and if so, which leaders are more effective?

Public Diplomacy Increases Net Foreign Public Approval

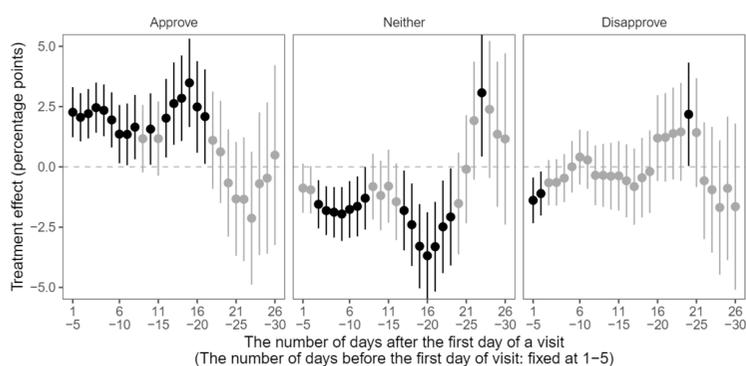


Figure from Horiuchi, Goldsmith and Matush. “Does Public Diplomacy Sway Foreign Public Opinion? Identifying the Effect of High-Level Visits,” *American Political Science Review*, June 2021.

- 88 leaders visited a country during a Gallup survey period. This allows as-if random identification of the effect of the visit on foreign public opinion.
- Analysis demonstrates that public diplomacy in the form of high-level visits increase foreign public approval. We theorize that this net positive effect is driven by 1) an increase in media attention, and 2) an increase in positive frames.

Who Gets Media Attention?

I argue that the public will be most interested in leaders who can influence international outcomes that are relevant to them. As a result, market-driven media will pay greater attention to those leaders. I expect that leaders will be more successful in capturing media coverage in states that are already their greatest “enemies” or their strongest “friends.”

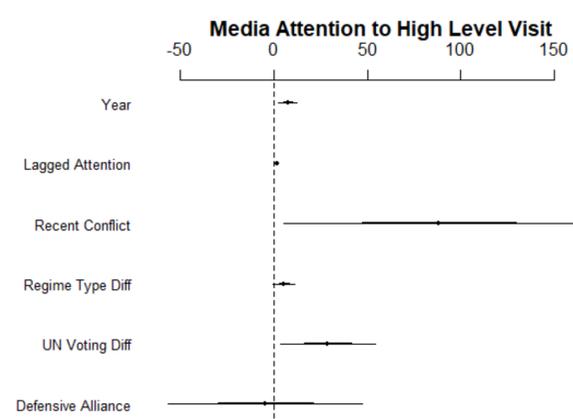
Hypotheses

- 1) Leaders from recent conflict partners will receive a greater increase in media attention.
- 2) Leaders from states with different expressed preferences will receive a greater increase in media attention.
- 3) Leaders from allied states will receive a greater increase in media attention.

Data

- 1) International visits of leaders from 8 countries: Brazil, Canada, China, Germany, India, Japan, Russia, the US, and the UK.
- 2) Volume of media coverage (Lexis Nexis) during visit relative to one month prior.
- 3) Measures of relevance
 - Conflict since 2000
 - Difference in UN voting ideal points
 - Regime type difference (Authoritarian-Democratic)
 - Defensive Alliances

Results



- Leaders from states with recent conflicts, more different regime types, and more different UN voting histories garner a greater increase in media attention when they visit a foreign country.
- Leaders from states with a defensive alliances do not receive a significantly different change in media attention.

Spanish Versus English Reading and Mathematics Achievement: Variation Across English Language Proficiency Levels

- At what levels of English language proficiency (ELP) do students who took reading and math assessments in English perform higher than those who took reading and math assessments in Spanish?

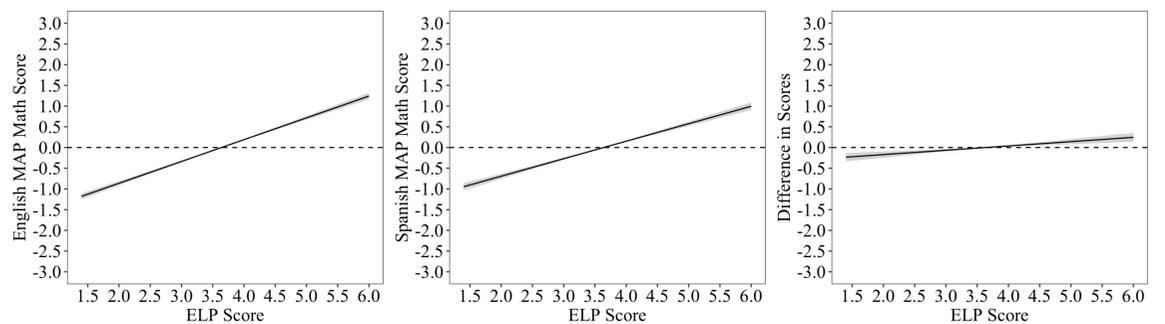
- We predicted that students who are closer to proficiency in English would perform higher on English assessment.

- Data

- Students in Grades 2-8 ($n \approx 2,300$)
- Students took math, reading, and ELP assessment as part of regular district procedures.
- 49% took Spanish math, and 39% took Spanish reading.

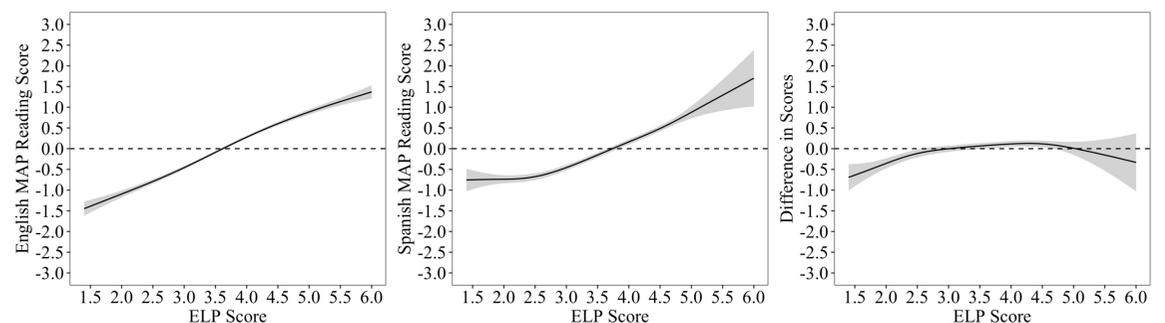
- Students with lower ELP generally have lower reading and mathematics scores in English.

Figure 1.
English and Spanish Math Achievement



Note. Columns 1 and 2 show English or Spanish achievement by ELP; column 3 shows the difference between English and Spanish achievement by ELP. MAP = Measures of Academic Progress. Y-axis is in standard deviation units.

Figure 2.
English and Spanish Reading Achievement



Note. Columns 1 and 2 show English or Spanish achievement by ELP; column 3 shows the difference between English and Spanish achievement by ELP. MAP = Measures of Academic Progress. Y-axis is in standard deviation units.

This work may help identify which students may benefit from assessment in Spanish or English.

More work is needed to understand which areas of language, reading, and mathematics relate most strongly.

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Combining SNV calling and cell clustering to identify cells in scRNAseq data



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Motivation

Single-cell RNA sequencing (scRNAseq) data makes it possible to identify the cell types as it separately sequences each cell. Since scRNAseq data usually have thousands of cells sequenced at one time, cell clustering, the process of clustering the cells according to their gene expression profile, usually precedes cell type identification. It is crucial to accurately cluster the cells and identify the cell types in cancer treatment for the measurement of the tumor or immune cell prevalence (percentage of the tumor or immune cells) and the study of the tumor micro-environment. Clustering methods without the dimension reduction face the challenges of missing data and computing distance/similarity at a high dimension. And those with dimension reduction, on the other hand, suffer from the lack of the meaningful interpretation of the genes that separate the clusters. Furthermore, they often cannot find a clear cut between two clusters.

Existing Literature

	DESC [1]	SouporCell[2]	Vireo[3]	scSplit[4]	Subclones, superclones[5]
Data type	Can handle complex datasets with three levels of batch effects and data generated with different scRNA-seq protocols: Fluidigm C1, SMART-seq, CEL-seq and CEL-seq2.	Mixed samples of scRNAseq data obtained by pooling cells from multiple donors using droplet based scRNAseq protocols such as drop-seq or 10X Genomics.	Single-cell RNA-seq data from Droplet sequencing methods such as drop-seq and 10X Genomics Chromium platform.	Mainly droplet-based scRNA-seq such as drop-seq and 10X Genomics Chromium but can also be used for data from other scRNA-seq protocols.	High-throughput single cell DNA sequence data obtained using ALT technology. The barcoded single-cell DNA libraries had a mean size of 312 bp.
Problem	The authors cluster scRNA-seq data cells into different clusters based on gene expression and handles the problem of batch effect by removing them.	The authors presented methods to cluster cells by their genetic variants without requiring a genotype reference and validated across a wide range of challenging scenarios while also estimating amount of ambient RNA in the sample.	Vireo uses a set of common genetic variants from individuals to cluster cells and in turn do probabilistic demultiplexing where each cell is assigned to one of the individuals.	scSplit identifies SNVs and then models allelic counts to assign cells to clusters. It utilizes genetic differences inferred from scRNA-seq data to demultiplex pooled samples and enables mapping clusters of cells to original samples.	Cells sharing highly similar copy number profiles representing a clonal expansion from a single genotype were clustered and named as subclones. A higher-order organization of subclone groups sharing a subset of CNA events were defined as superclones.
Methodology	An unsupervised deep learning algorithm that iteratively learns cluster-specific gene expression representation and cluster assignments for scRNA-seq analysis. It gradually removes batch effect over iterations.	The authors remap reads with minimap2 instead of using STAR alignment and then called variants using freebayes. Using cell allele support counts, the cells are clustered using sparse mixture model clustering.	Vireo clustered cells using a set of common genetic variants from K individuals. Using a computationally efficient Bayesian model these clusters were used to demultiplex single cell data from pooled experimental designs.	Mixed sample BAM file is filtered out to keep reads with a list of valid barcodes. The authors called SNVs on filtered BAM file using Freebayes v1.2. Then allelic counts were modelled to assign cells to clusters using expectation-maximization framework.	First, single-cell copy number data was embedded using UMAP. Then SNN was used to cluster superclones. The UMAP embedding was used as an input for clustering algorithm hdbscan to identify subclones.

Our Strategy

scRNAseq provides a vector of the expression of thousands of genes in a cell. We first use a dimensionality reduction technique (such as UMAP) that reduces the number of genes taken into account, thus transforming the data from a high-dimension space to a low-dimension space. Since we want meaningful interpretation of the genes we use gene expression to cluster the cells. Our strategy of clustering the cells is based on the reduced dimension of the gene expressions and the SNV calling. To be more specific, we believe that SNV calling can improve clustering the cells since typically, different type of cells have different SNVs. On the other hand, the SNV calling can be improved by an accurate clustering of the cells based on their gene expression. Therefore, an iterative approach is used to improve both the cell clustering and SNV calling.

Dataset: Our Single-cell RNA-seq data is from a full length T1D donor obtained using Fluidigm C1 protocol and demultiplexed. This dataset has 582 cells of the donor and has around 6000 expressed genes per cell. The sequence is analyzed with HiSeq.

References

- [1] Li, X., Wang, K., Lyu, Y. *et al.* Deep learning enables accurate clustering with batch effect removal in single-cell RNA-seq analysis. *Nat Commun* 11, 2338 (2020).
- [2] Heaton, H., Talman, A.M., Knights, A. *et al.* Souporcell: robust clustering of single-cell RNA-seq data by genotype without reference genotypes. *Nat Methods* 17, 615–620 (2020).
- [3] Huang, Y., McCarthy, D.J. & Stegle, O. Vireo: Bayesian demultiplexing of pooled single-cell RNA-seq data without genotype reference. *Genome Biol* 20, 273 (2019)
- [4] Xu, J., Falconer, C., Nguyen, Q. *et al.* Genotype-free demultiplexing of pooled single-cell RNA-seq. *Genome Biol* 20, 290 (2019)
- [5] Minussi, D.C., Nicholson, M.D., Ye, H. *et al.* Breast tumours maintain a reservoir of subclonal diversity during expansion. *Nature* 592, 302–308 (2021).

Atlanta HIV/AIDS Landscapes and the Geographies of PrEP

Problem:

There is a lack of PrEP uptake in the Black community (only 11% of PrEP users identify as Black). Black communities are 12% of the US population, but account for 43% of new HIV infections.

What is PrEP: PrEP (pre-exposure prophylaxis) is a biomedical regimen that requires taking a pill once a day to prevent the spread of HIV from Sex or Injection Drug Use.

Question

How do landscapes contribute the lack of PrEP uptake in the US South, in particular, Atlanta, GA?

Why Landscapes?

Landscapes denote a human-environment relationship that has been naturalized in people's relationship to place. For many, to be Black and Queer is to have a cultural/social/place-based relationship to the HIV/AIDS epidemic.

Landscapes help address gaps in Geography scholarship on HIV/AIDS and Black communities focusing on:

- Knowledge Production
- Discourse
- Stigma

Data Collection

10-1hr oral history with Black queer community members over zoom

- Average Age 55+
- 4 HIV-positive/ 6 HIV-negative
- Live within 100 miles of the Atlanta Metro Area

Key Interview Themes

Connected to Landscapes

- Rural/Urban
- Black Queer Care Networks
- Black Church/Faith/Spirituality

Future Steps

- Code interviews
- Analysis
- Develop themes into research narratives

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Tunable nano-light excitations in dual-gated bilayer graphene devices

Guangxin Ni

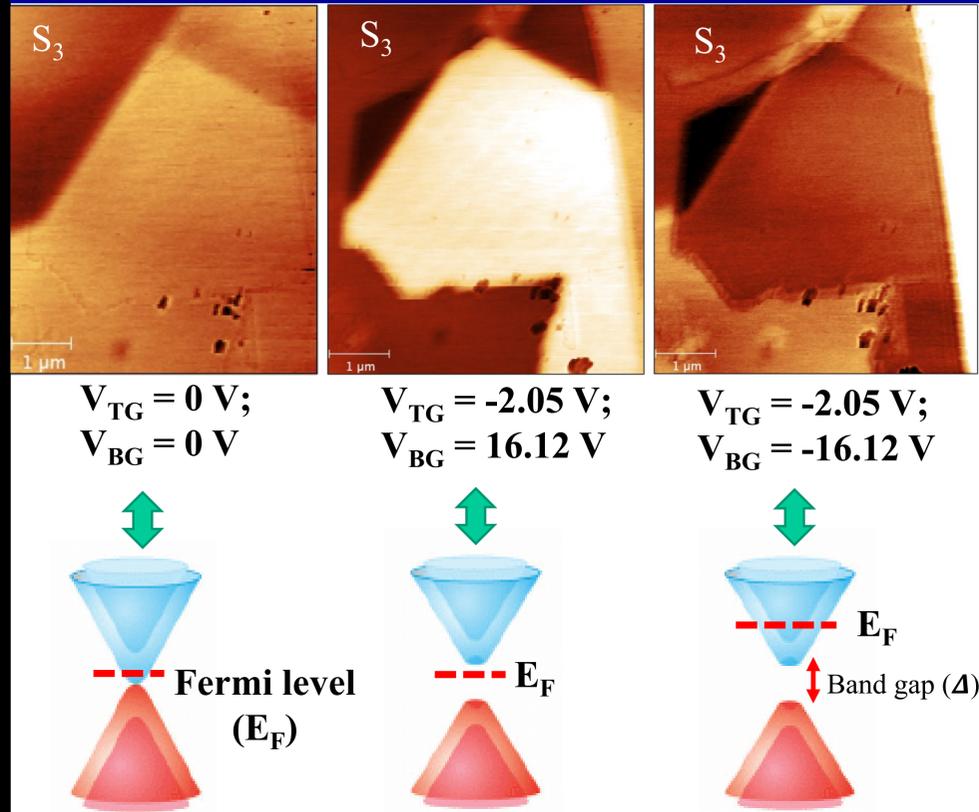
Department of Physics, Florida State University, Tallahassee, FL, USA, 32306
National High Magnetic Field Laboratory, Florida State University, FL, USA, 32310



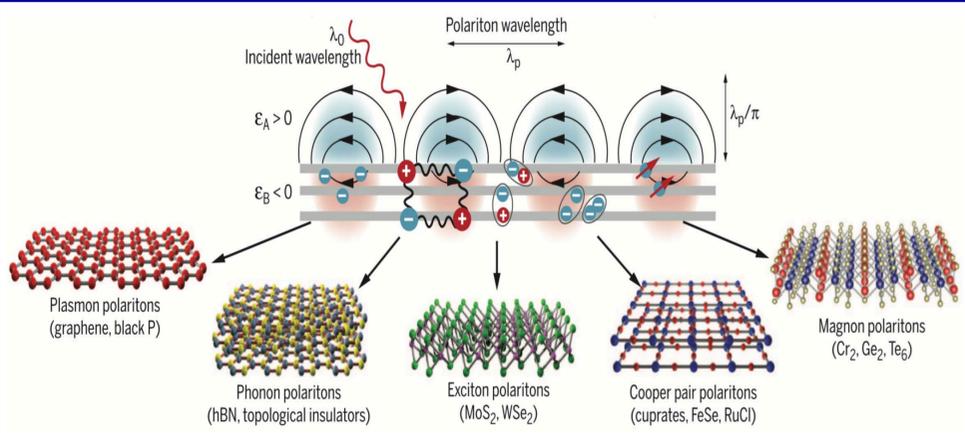
Summary of experimental results & conclusions

- **Direct nano-infrared imaging of plasmon polaritons in dual-gated bilayer graphene at cryogenic temperatures.**
- **Demonstration of displacement field tunable surface plasmons in high mobility encapsulated graphene devices.**
- **Towards the realization of topological nano-light control and manipulation at the nanoscale.**

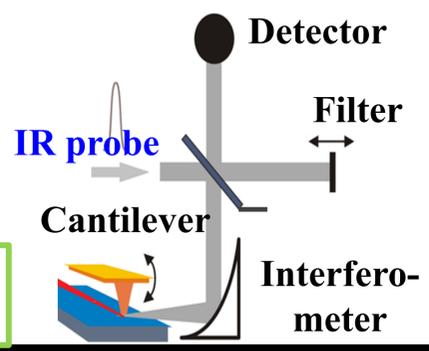
Near-field nano-imaging of dual-gated bilayer graphene



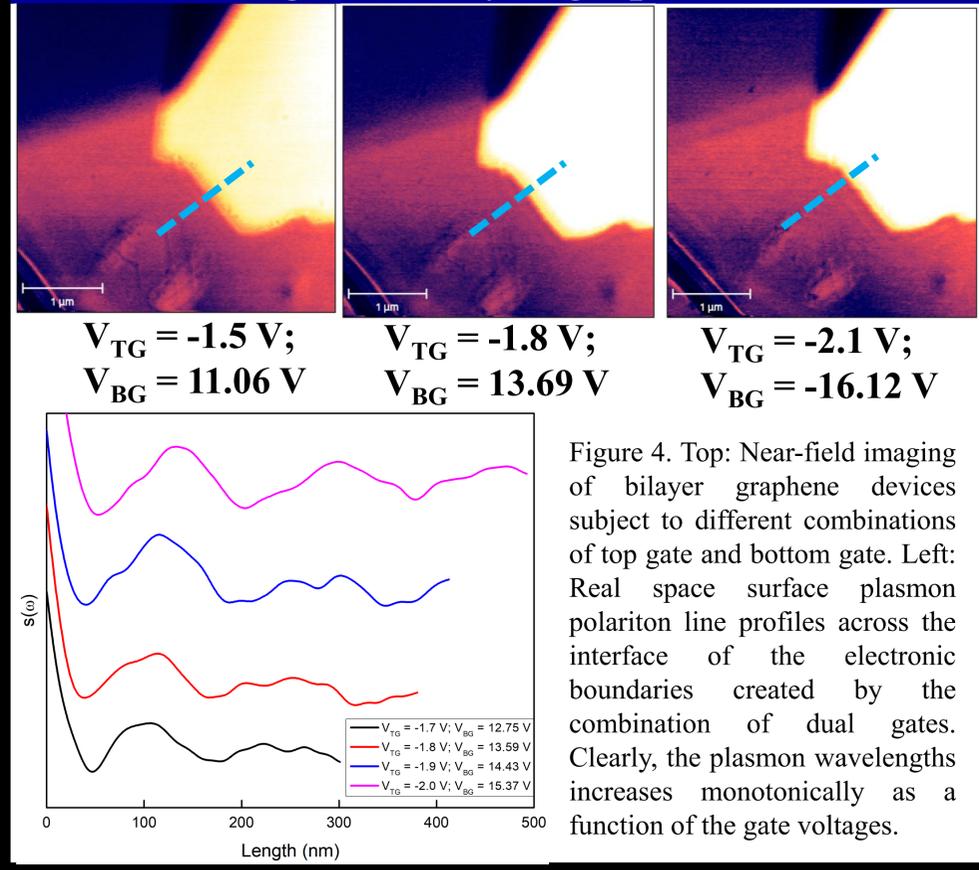
Polaritons in vdW materials and infrared (IR) nano-imaging setup



- Nano-IR imaging with < 20 nm spatial resolution
- High photon momentum q of $10^5 - 10^6 \text{ cm}^{-1}$
- In-situ electrical transport and nano-photocurrent image



Surface plasmon polaritons in dual-gated bilayer graphene



Cryogenic near-field optical nanoscopy

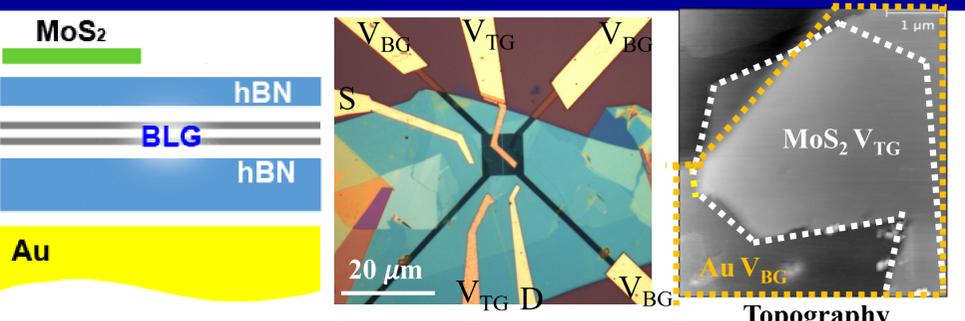


Figure 1. left, sketch of device configuration; middle: optical image of devices; right: AFM topography image.

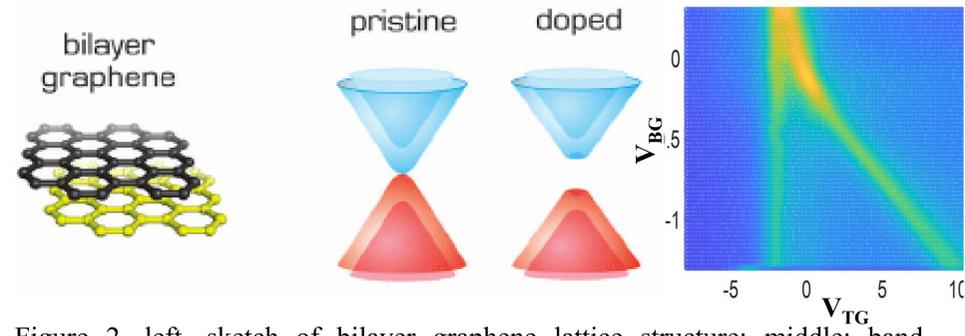


Figure 2. left, sketch of bilayer graphene lattice structure; middle: band structure of pristine and doped bilayer graphene; right: gate-gate mapping.

Future plan

- **Explore the chiral topological plasmon polaritons along artificial domain walls created by gating Bernal stacked bilayer graphene.**
- **Investigate Cooper-pair plasmons in twisted bilayer graphene. Identify the fundamental origin of the superconductivity at different filling factors.**

Circulatory Chemokines Participate in Sepsis Induced Myopathy and Epigenetic Changes in Satellite Cells of Mice

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BACKGROUND

- Sepsis is a condition of life-threatening organ dysfunction caused by a dysregulated host response to infection and carries a high risk of mortality. Despite decreasing in-hospital mortality rates due to early recognition and aggressive intensive care unit (ICU) management, a rapidly growing number of “sepsis survivors” experience persistent and severe skeletal muscle abnormalities. For unknown reasons, the skeletal muscles of these patients never return to their pre-septic functional condition and display compromised regenerative capacity. This represents a major knowledge gap in sepsis research and skeletal muscle biology.
- Healthy skeletal muscles possess a great regenerative capacity that is regulated by a population of resident myogenic cells known as satellite cells (SCs)
- The goal of this project was to examine the participation of circulatory chemokines on sepsis-induced myopathy and epigenetic changes in SCs of mice.

METHODS

Animals: We studied 4-5 mo old male C57Bl6 mice 7 days after cecal ligation and puncture (CLP) to induce sepsis or sham surgeries.

Surgeries: We induced intraperitoneal, polymicrobial sepsis by performing a CLP surgical procedure. A small incision was made on the abdominal wall. The cecum was exposed and ligated at the terminal third using absorbable suture and punctured through and through with a 28-gauge needle. The cecum was immediately returned to its place into the abdominal cavity. For sham surgeries, the cecum was exposed without being ligated or punctured. The abdominal incision was closed, and mice were returned to their cage.

Blood samples and Luminex: Blood was collected via cardiac stick and the serum was used as conditioned media for cell culture experiments described below. One aliquot was used to determine the chemokine content of the serum via Luminex (Magpix).

Force Production: Soleus muscles were dissected 7 days after surgeries and transferred into a tissue bath apparatus (Model 800A, Dual Mode Muscle Lever 300C; Aurora Scientific) filled with gas equilibrated Ringer’s solution at 22°C. The distal tendon was attached to a rigid post, and the proximal tendon was attached to a force transducer at resting length. The optimal muscle length (L_0) was established by adjusting the muscle length in isometric twitch conditions, until maximum force was obtained. Stimulus frequency of 200 Hz (0.25-ms pulse and 0.5-s train durations) was studied.

Satellite Cell (SC) Isolation: SCs were isolated from Sham and Septic mice using the Pronase Isolation Kit MACS protocol (Miltenyi Biotec). Sham Cells were resuspended in growth media (Ham’s F10 with 20% FBS, 1% penicillin/streptomycin and 2.5ng/ml of bFGF) containing serum from septic or sham mice and plated into a collagen-coated 60mm Petri dish. We measured proliferation by monitoring DAPI positive cell number over 4 days. Proliferation was analyzed using CellProfiler (Broad Institute) to assess MF20+ area (myotube area).

Methylation sequencing: Upon SC DNA isolation of a subset of cells from Sham and Septic mice, genome-wide bisulfite sequencing was performed to examine cytosine DNA methylation at nucleotide resolution along single DNA strands (Zymo). Hypermethylation (increased methylation) of gene promoters is associated with gene repression while hypomethylation (decreased methylation) is associated with gene activation. Only comparisons where $p < 0.04$ were included.

RESULTS

Figure 1

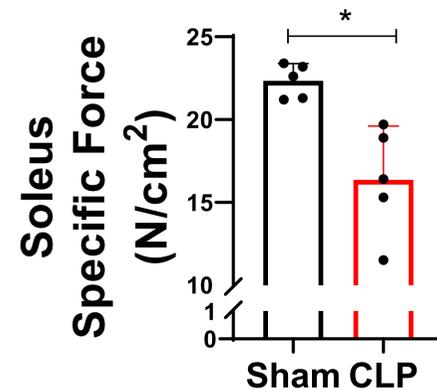


Figure 1: Specific force of solei muscles from Sham and CLP mice 7 days after surgery. Data are mean±SEM.

Figure 2

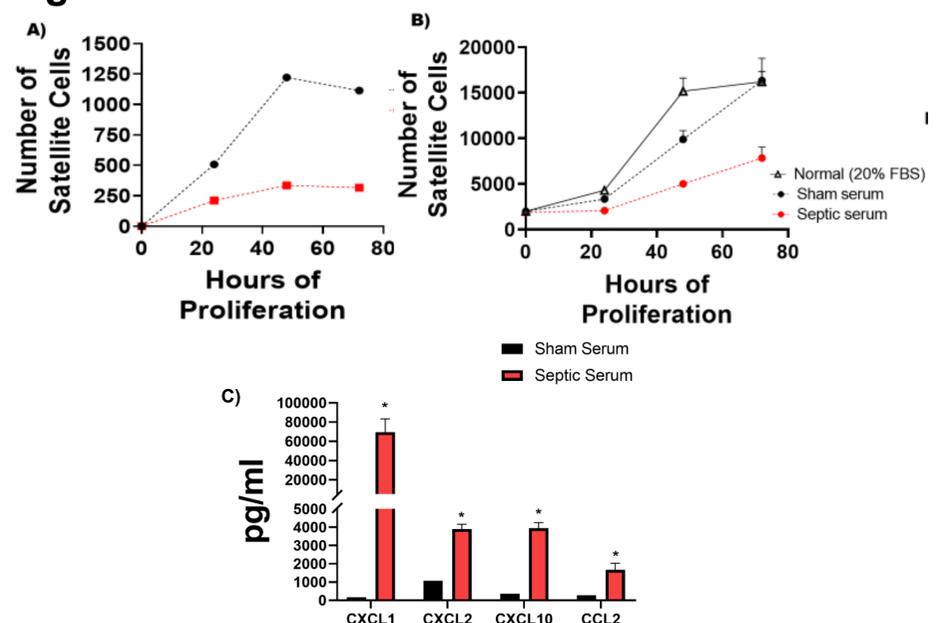


Figure 2: A) Proliferation of satellite cells isolated from Sham and CLP mice at 7 days. Cells were plated after isolation and monitored for 72 hours. B) Proliferation of healthy satellite cells exposed to 20% FBS, Sham or Septic serum.. Data are mean±SEM. C) Concentration of chemokines in Sham and Septic serum used in experiments described in panels A and B.

Figure 3

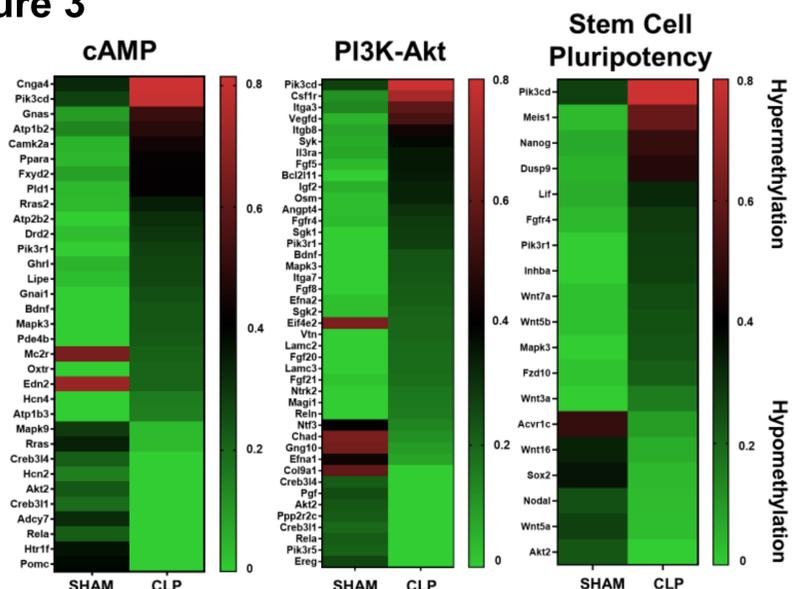


Figure 3: DNA methylation ratio within the promoter region of satellite cells samples from young C57Bl6 isolated 7 days post Sham or CLP surgeries. Data for 3 relevant pathways for SCs proliferation, differentiation and muscle growth.

CONCLUSIONS

- Sepsis, induced via CLP, promotes accumulation of chemokines into the circulation and skeletal muscle weakness.
- Exposure of healthy SCs to septic serum halted the proliferative capacity of this population of cells.
- Sepsis promoted significant SCs epigenetic alterations in genes associated with proliferation, differentiation, and muscle growth.

Faculty Perspectives on Doctoral Curriculum and Preparation of Music Teacher Educators

Kari Adams

Purpose and Research Questions

Findings: Research Question 1

Findings: Research Question 2

The purpose of this study is to examine the values and perspectives of music education faculty members on doctoral curriculum.



What factors do faculty members believe most contributed to their own preparation to teach in higher education?



What attitudes do music education faculty members at doctoral-granting institutions hold toward curricular needs of doctoral students?

I received the most instruction in...

Research	82%
Teaching	17%
Musicianship	1%

How prepared did you feel to teach?

Extremely prepared	45%
Prepared	42%
Somewhat prepared	11%
Not prepared	2%

What factors most prepared you to teach?

- ❖ Mentorship, graduate assistantships, and coursework were mentioned the most frequently.
- ❖ 68% worked as TAs, usually for secondary or elementary methods.
- ❖ 60% worked as instructor of record, usually for a music for non-majors course.

Doctoral students in music education should be required to take coursework specifically dedicated to the skills necessary for teacher education.

Strongly Agree	37%
Somewhat Agree	40%
Neither Agree nor Disagree	15%
Somewhat Disagree	6%
Strongly Disagree	2%

The primary focus of the doctoral degree should be on research skills, not teaching skills.

Strongly Agree	16%
Somewhat Agree	28%
Neither Agree nor Disagree	24%
Somewhat Disagree	24%
Strongly Disagree	8%

Doctoral students bring with them K-12 teaching experience, and those skills will easily transfer to their new teaching role.

Strongly Agree	10%
Somewhat Agree	57%
Neither Agree nor Disagree	13%
Somewhat Disagree	17%
Strongly Disagree	3%

To view sample participant quotes and more, scan here! →



Discussion and Next Steps

1

Faculty felt prepared, but only to copy courses and strategies from other professors. How do we prepare students to be innovative in course design and strategy use?

2

There is a need for discourse on the nature of the degree, the needs of students, and the values and assumptions faculty hold. These conversations need to include faculty, students, administrators, and recent graduates.

3

Future studies may examine the attitudes of early-career faculty and of doctoral students. Individualization was an important theme, so examining the efficacy of individualization strategies is another valuable line of inquiry.