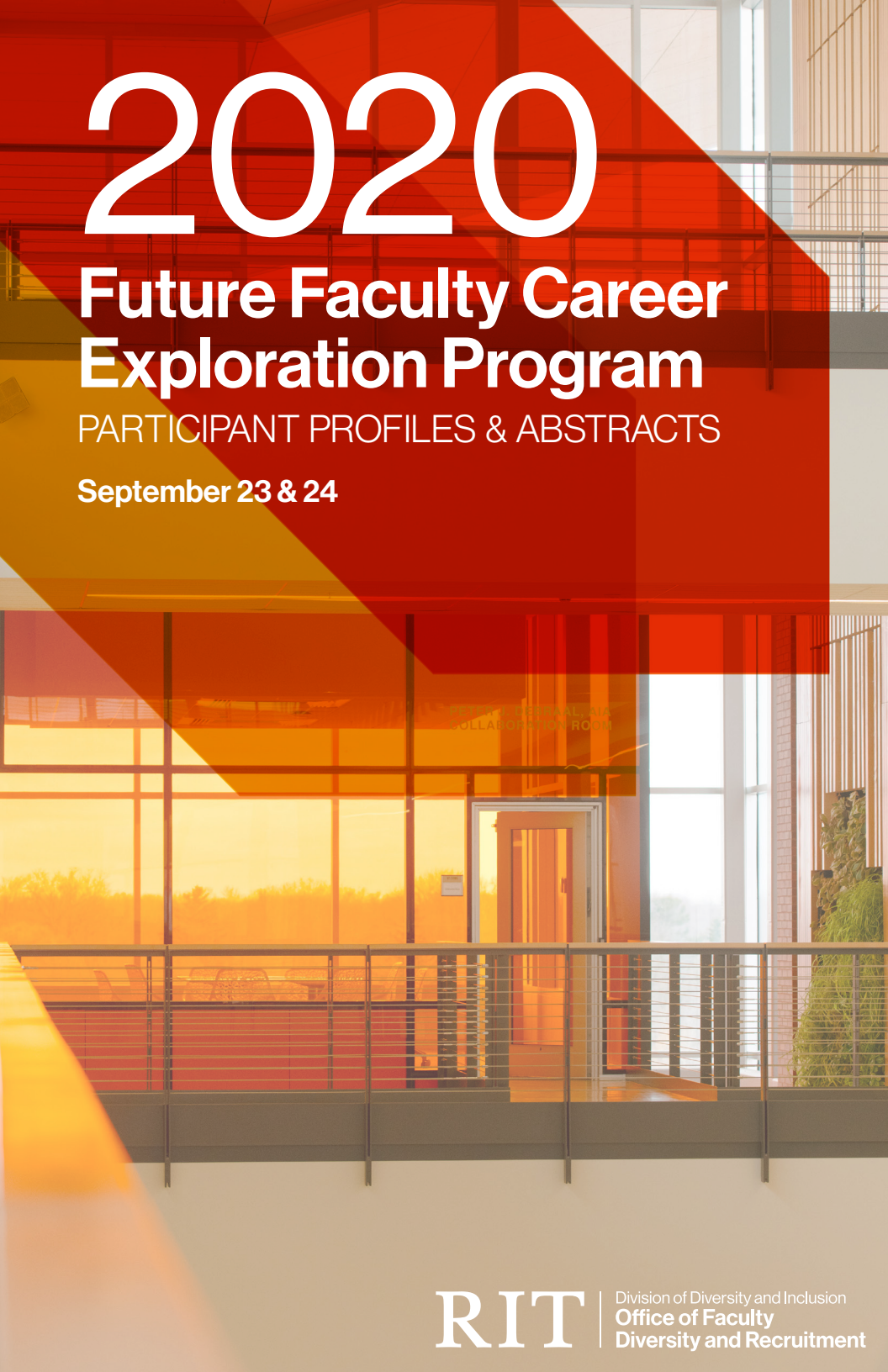


2020

Future Faculty Career Exploration Program

PARTICIPANT PROFILES & ABSTRACTS

September 23 & 24

RIT | Division of Diversity and Inclusion
Office of Faculty Diversity and Recruitment

The Rochester Institute of Technology is pleased to welcome you to its 17th Future Faculty Career Exploration Program. These are unprecedented and challenging times in our world. With the landscape of higher education ever-evolving, we are glad you are able to join us virtually this year for our annual program.

RIT is a university with technology in our name. We are known for our world-class engineering, computing, and technology programs, but we are also home to nationally ranked art and design majors. RIT offers more courses in the humanities and social sciences than most liberal arts colleges. Our business programs encourage entrepreneurial thinking and innovation by leveraging technology. Opportunities for deaf and hard-of-hearing students at our National Technical Institute for the Deaf are unmatched by any university in the world.

Our success begins with our exceptional and diverse community of faculty, staff and students. It's not just our faculty's passion for teaching that sets RIT faculty apart; it's their commitment to motivate, inspire, and engage. Our faculty are hands-on educators, leaders in research, and experts in their fields of study. They share their collective knowledge, encourage research collaboration with their students, and drive creation of new knowledge and innovation. We seek faculty who can bring a unique perspective into our classrooms and labs, and who can lead our institution into the future.

RIT has a strong commitment to the Future Faculty Career Exploration Program. This nationally recognized program, serving historically underrepresented scholars and artists, is designed not only to help us learn more about you and your interests, but also for you to gain a better understanding of RIT, and to see first-hand our commitment to diversity and inclusion.

Best wishes for a productive and exciting visit!

David C. Munson, Jr.
RIT President

Future Faculty Colleagues,

I am delighted to welcome you as part of the 17th class of the Future Faculty Career Exploration Program (FFCEP) at Rochester Institute of Technology. This program plays a crucial role in growing and diversifying our faculty, and creates opportunities for you to build a network among peers as you prepare for your university career.

Past FFCEP participants cite many benefits of participating-including gaining insight into our university, opportunities to share research and connections, and the chance to see first-hand RIT's commitment to diversity and inclusion. I am proud of the efforts the Office of Faculty Diversity and Recruitment has made to welcome prospective faculty members and serve as a bridge to participants at the earliest stages of their academic careers.

Diversity and inclusion are two of the most important factors shaping the future of higher education—as well as the students we serve. RIT is committed to this future and to leading the way for others. This commitment is at the heart of RIT's strategic plan, "Greatness through Difference" which includes among its major initiatives: increasing the number and percent of AALANA and female students and faculty, decreasing the achievement gap, increasing AALANA graduation rates, and establishing RIT as a model of inclusive excellence for faculty and staff. As one part of its support for these objectives, RIT has developed innovative faculty recruitment strategies that seek to increase the number of historically underrepresented minorities and women faculty, including the Future Faculty Career Exploration Program.

Thank you for participating in this engaging and exciting professional development opportunity, and welcome to RIT.

Sincerely,

Ellen Granberg
Provost and Senior Vice President for Academic Affairs

Congratulations on being selected to participate in the 17th class of Rochester Institute of Technology's Future Faculty Career Exploration Program! I applaud your many achievements to date and take great honor in formally welcoming your participation in this exciting two-day RIT event.

RIT embraces inclusive excellence as we advance the exceptional! Diversity and inclusion are fundamental aspects of RIT's identity as an institution and are intrinsically tied to its historic strength as one of America's most innovative and forward-looking universities. RIT enjoys national recognition among leaders in diversity in higher education. The Office of Faculty Diversity & Recruitment, for example, received national recognition for RIT's more than ten-year commitment to increasing faculty diversity. RIT was also recognized as one of the "Top 200 Colleges for Native Americans". *INSIGHT Into Diversity* magazine not only recognized RIT as a Diversity Champion, but for the 6th year in a row, RIT was awarded the Higher Education Excellence in Diversity award. The American Society for Engineering Education (ASEE) also honored RIT among award recipients in the inaugural year of the ASEE Diversity Recognition Program.

Today, *RIT* positions itself to increase the number and percent of African American, Latinx and Native American (AALANA) and female faculty, especially in STEM fields. We understand well the importance of diverse, talented faculty in moving RIT forward in greatness through difference. So, we are honored to welcome you to our campus as we learn more about each other.

An outstanding two-day program has been prepared for you. During this time, I hope your many questions regarding RIT/NTID—our students, staff, faculty, programs, departments, colleges, campus and community—are addressed and answered. Most important, I hope you get a better idea of your potential space in the RIT family as we both explore the many opportunities for a wonderful relationship.

Keith Jenkins
Vice President and Associate Provost for Diversity & Inclusion

I'd like to welcome you as part of the 17th class of the RIT Future Faculty Career Exploration Program, and congratulate you on your career success! This program is an exemplar of our longstanding commitment to inclusive excellence at RIT. We place high value on a diverse and excellent faculty, recognizing that different perspectives support creativity and innovation in research and scholarship, in the classroom, and across the campus. Your voices, ideas, and breadth of research have a positive impact on RIT and higher education in general.

The Office of Faculty Affairs is focused, in part, on providing faculty career development opportunities through best practices, polices, programs, and professional development that help our faculty build successful careers at RIT. I am looking forward to sharing with you more about the support our office provides to faculty at all stages of their career.

I am pleased that you have chosen to be part of our future faculty program and look forward to working with you to identify opportunities to launch your career forward at RIT. Thank you for helping with RIT's mission to "shape the future and improve the world through creativity and innovation!"

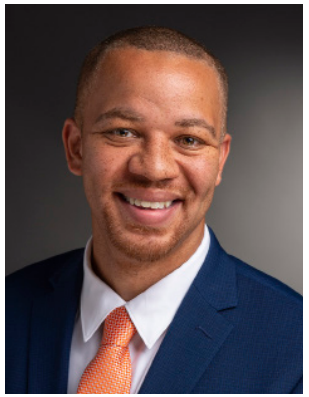
Carmala Garzione
Associate Provost for Faculty Affairs

Dear Colleagues,

Congratulations on your acceptance into the 17th cohort of our Future Faculty Career Exploration Program, and of course, welcome to the Rochester Institute of Technology.

For some of you, we have met before, (more than likely during a visit to your campus), so it is a pleasure to see you again! Before we get too far into programming, research talks, and workshops, please take a moment to congratulate yourself. After all, at the conclusion of an exhaustive and rigorous nationwide search, you were selected to join this prestigious cohort. In addition, each of you represent the best minds in higher education, as articulated and represented by your research, expertise and skill sets. Your presence represents a longstanding commitment to inclusive excellence here at RIT that is dedicated to recruiting the best talent in America; so again, please take a moment to celebrate your success.

Over the course of the next few days, I highly encourage you to attend and take advantage of the many great workshops, panels, and networking events. My hope is that you seize the opportunity to engage, collaborate, and cultivate relationships with other participants as well as RIT faculty. I too hope that over the course of this program, you will experience the same magnetism that drew me to RIT, and discover the quality, beauty and innovation that sets RIT apart.



Again, congratulations on your acceptance and for those of you I have not met, I look forward to personally making your acquaintance.

Donathan Brown
Assistant Provost and Assistant Vice President for Faculty Diversity & Recruitment

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College of Art and Design

Hiba Ali, M.F.A.
Alexis Salas, Ph.D.

Hiba Ali, M.F.A.

Assistant Professor, University of Oregon
Ph.D. Candidate, Queens University

Profile

Hiba Ali is a digital artist, educator, scholar, DJ, experimental music producer and curator based across Chicago, IL, Austin, TX, and Toronto, ON. Ali is a Ph.D. candidate in Cultural Studies at Queens University, Kingston, Canada. Their performances and videos concern surveillance, womxn of colour, and labour. Ali studies Indian Ocean geographies through music, cloth and ritual. They conduct reading groups addressing digital media and workshops with open-source technology.

They have presented their work in Chicago, Stockholm, Toronto, New York, Istanbul, São Paulo, Detroit, Dubai, Austin, Vancouver, and Portland. Ali has written for THE SEEN Magazine, Newcity Chicago, Art Dubai, The State, VAM Magazine, ZORA: Medium, RTV Magazine, and Topical Cream Magazine.

Abstract

Amazonification under COVID-19: How Crises Produce Crises

Digital artist and scholar, Hiba Ali will share her research on Amazon's dispossession of their warehouse workers' racialized labour to intensify its use of surveillance locally and internationally. Ali will highlight the ways in which art and research can be used to support warehouse workers rights and fight for equity.

Alexis Salas, Ph.D.

Assistant Professor, Contemporary Art History, Theory and Criticism
Department of Art, New Mexico State University

Profile

Alexis Salas is an art historian of global modern and contemporary art with a specialization in Latin American and LatinX art. Salas earned her B.A. in Art History and Spanish Literature from Amherst College, and her M.A. in Art History from the University of Chicago. She completed her Ph.D. at University of Texas, Austin in 2020, with her dissertation "Disparity at Play: The Artists and Projects of Temístocles 44 (Mexico City, 1991-2003). She recently accepted a position at New Mexico State University as an Assistant Professor in the Department of Art.

Her courses include Queer and Feminist Art of the Contemporary America; The Feminine Grotesque: Cannibalism and Contemporary Art; Radical Visualities: Latin America and Latino Politics and Film. Recent scholarship focuses on Digital Activism in the Americas. Salas' first book looks at how an artists collective in Mexico City used the conditions of neoliberalism to produce subversive collective projects. Her second book will focus on the relationship of art (practices, markets, patrons) and oil.

Salas authored, "You Had to Be There: Artists' Spaces and Ephemeral Projects" (Below the Underground: Renegade Art and Action in 1990s Mexico, Getty Publications, 2019) and "On the Dematerializing and Rematerializing of Art in the Mexican 1990s" (Strange Currencies: Art & Action in Mexico City, 1990 – 2000, 2017). Lectures include "Collaboration and Collectivity in Latin American and Latino Art: Muralism and Its Specters" (Northwestern University, 2017) and "Theorizing the Global Culture City: Contemporary Mexican Art and Artists in Paris" (Centre allemande d'histoire de l'art de Paris, 2010).

Salas has curated, "All the Signs are (T)Here: Social Iconography in Mexican and Chicano Art from Collections at the University of Texas at Austin" (Blanton Museum of Art, 2014-2015). She served as curatorial advisor to "Below the Underground: Renegade Art and Action in Mexico in the 1990s," (Armory Center of the Arts, 2017) and "Strange Currencies: Art and Action in Mexico City, 1990-2000" (Moore College of Art & Design, 2016) for which she contributed catalogue essays.

In addition to numerous publication and invited lectures, Salas has received many prestigious awards and residencies, including the Jacob Javits Fellowship, Fulbright Fellowship, the DAAD Fellowship, Andrew W. Mellon curatorial fellowship in Modern and Contemporary Latin American Art at the Blanton Museum of Art, and the Fulbright Garcia-Robles Fellow in Mexico City, and several awards to conduct research, teach, and lecture in Latin America, Europe, and North America.

Salas is first-generation college student from a working-class family, who is a graduate of and recruiter for the Institute for the Recruitment for Teachers, which helps underrepresented students pursue graduate studies and work in higher education. Salas' work as an art historian, maker and curator inspire her research and experimental pedagogies as well as her service work within the academy.

Abstract

Exhibiting Disparity: When Global Art and Open Office Aesthetics Collide

Salas explores the collaborations between an artist collective (Temístocles 44) and an art gallery (galería kurimanzutto) as a means to study art under neoliberalism. Thinking about the artists' work through not only the *history* of *art* but also architecture, Salas marries aesthetic theory and intellectual perspectives from both Euro-America and the Global South. By considering the art space, that is, the space where art is exhibited, it asks not only how the place where art is exhibited imbues the very work itself with meanings, and also how that space subjects the artwork subject to certain discourses and interpretations.

In a global art system that asks objects to circulate from country to country and amongst different art events, it would seem that the art system as it stands ask art objects to consistently stand in for a stable, universal, and fixed set of meanings no matter where they are. However, Salas argues that ignoring place is no longer a tenable way to see objects, neither practically nor politically. This talk re-situates who and what we consider producers of art historical theory by arguing that we must expand artistic criteria by definitions of art through local understandings as well as offers a new perspective on so-called "social art practices."

"Exhibiting Disparity: When Global Art and Open Office Aesthetics Collide" addresses how a group of artists instrumentalized the material conditions and politics of 1990s Mexico City and adapted them -- perversely, cleverly, ironically, playfully, subversively-- to art world norms.

Saunders College of Business

Aziza Jones

Aziza Jones

Ph.D. Candidate
Rutgers University

Profile

Aziza Jones is a marketing Ph.D. candidate at Rutgers University. She received her B.S. degree in Marketing, Management, and Entrepreneurship from the University of Wisconsin—Madison in 2013. After her graduation, Jones spent time as a project manager for a sales company and as a research assistant at Georgia State University. Jones' experience as a research assistant helped her discover her passion for consumer research, prompting her to apply to Rutgers University.

After joining Rutgers in 2015, she began studying how social signaling motivations and prosocial concerns influence consumer behavior. Her dissertation investigates how consumers use products to convey social status. She has additional projects that examine how racial prejudices impact consumer choice and how assumptions about the wealth of others influence generosity. In addition to progressing her research, Jones is currently the Vice President of the Ph.D. Project Marketing Doctoral Student Association. Apart from academia, Jones enjoys snowboarding, running, learning Spanish, and playing chess.

Abstract

Conspicuous Self-Control: When Status Motives Lead Consumers to Signal Restraint

The current research uncovers an important, unconsidered outcome of status signaling motivations – engagement in self-control. Extant literature shows that status signaling motivations enhance indulgence. That is, such motivations lead consumers to engage in indulgent spending and purchase expensive, luxurious products. This occurs because status signaling motivations increase a consumer's desire to convey that they are wealthy, which leads them to purchase more expensive products over less expensive options.

The current research shows that when consumers are presented with products similar in price, and therefore are less able to convey wealth through their product choice, those with status signaling motives attempt to conspicuously display self-control (e.g., selecting healthier food choices over less healthy options; selecting self-control enhancing technologies over entertainment technologies). Such choices allow consumers to demonstrate that they are goal-oriented, which consumers associate with high status. This effect is not present when consumers have the opportunity to signal wealth unless they are reminded that saving behavior can signal self-control.

This research links three streams of literature on status signaling, self-control, and goal setting and makes important theoretical advancements to each one. It also offers practical implications for how consumers can encourage themselves to engage in self-control.

By highlighting this novel impetus to self-control, this work offers a tool that consumers can use to motivate themselves to make healthier, financially conscious choices. It also helps marketers understand the nuance in the effectiveness of using status signaling appeals to sell expensive, luxurious products.

Golisano College of Computing and Information Sciences

Earl Huff Jr.

Earl Huff Jr.

Ph.D. Candidate and Graduate Research Assistant
Clemson University

Profile

Earl Huff, Jr. is a 3rd year Ph.D. candidate studying Human-Centered Computing at Clemson University's School of Computing. He currently works as a Graduate Research Assistant in the Design and Research of In-Vehicle Experiences (DRIVE) Lab under the supervision of Dr. Julian Brinkley. Huff earned his B.S. and M.S. in Computer Science from Rowan University.

Huff's research intersects the areas of human-computer interaction (HCI), accessibility, computing education, and broadening participation. He is investigating barriers that prevent equitable access to technology and computing education for marginalized and disadvantaged populations. His doctoral research examines the learning efficacies and challenges of high school students with visual impairments in programming courses.

His research has been published in some of the top venues in accessibility, HCI and computing education. Huff has published in the International SIGACCESS Conference on Computing and Accessibility (ASSETS) as well as in Transactions on Accessible Computing (TACCESS). His computing education research has been published in the Technical Symposium for Computer Science Education (SIGCSE) and Research for Equity and Sustained Participation in Engineering, Science, and Technology (RESPECT). He is also published in HCI-focused venues such as the SIGCHI Conference on Human Factors for Computer Systems (CHI) and the International Conference on Human-Computer Interaction (HCII).

Abstract

Learning to Code without Vision: The Proficiencies and Challenges of High School Students with Visual Impairments in Programming

The computing and information technology industry is experiencing substantial growth in software developer and IT specialist jobs. However, the number of eligible candidates for these jobs do not meet the ever-growing demand. The considerable disparity in available jobs and available workers opens the potential for candidates who were often previously overlooked for consideration for such positions.

Blind or visually impaired (BVI) persons may see significant opportunities for jobs in software development, despite such positions requiring primarily visually demanding tasks. However, BVI persons may face barriers towards 1) pursuing careers in programming and 2) contributing at an equal level with their sighted counterparts. Such barriers may be due in part to accessibility concerns with the current state of professional development tools such as integrated development environments (IDEs) and current programming processes and procedures that disproportionately benefit those with sight.

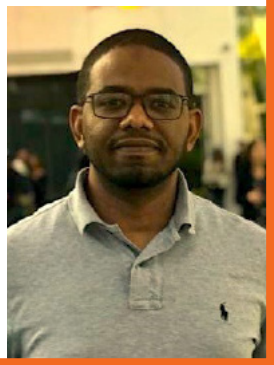
These current issues can be traced to the education of students with visual impairments who are learning to write code using the same technology and processes as professionals. More research is required to assess BVI persons' capabilities and limitations to address problems that may serve as barriers towards learning to become programmers and pursuing a career in computing.

Co-hosted by
Golisano College of Computing and Information Sciences & the National Technical Institute for the Deaf

Abdelkareem (Kareem) Bedri

Abdelkareem (Kareem) Bedri

Ph.D. Candidate
Carnegie Mellon University



Profile

Abdelkareem (Kareem) Bedri is a 5th year Ph.D. candidate at Carnegie Mellon University (CMU). His research interests are in wearable computing, ubiquitous computing, sensing, mobile health, and assistive technology. In the past few years, Bedri worked on developing a suite of wearables that helped users automatically monitor their diet and physical exercise in free-living environments. He received the Google, Qualcomm, and CMU Presidential fellowships as recognition for his research work.

Abstract

Extending Capabilities of Fitness Trackers

Habits and routines define a major part of our behavior and they play a key role in improving our health or deteriorating it. In 2017, the World Health Organization identified the habits of tobacco use, unhealthy diet, physical inactivity, and harmful use of alcohol as the leading risk factors for the majority of all chronic illnesses.

Monitoring human behavior has been one of the most effective methods to identify and combat undesired habits. Monitoring activity also brings attention to good habits and motivates individuals to maintain them. Current behavior monitoring methods are mostly reliant on self-report, but in the midst of our busy lifestyle, adherence to selfmonitoring becomes very challenging. Many studies have shown that the majority of participants opt-out of journaling in a very short period due to the tedious and taxing nature of the process.

Current wearable technologies have enabled users to monitor some health aspects by tracking their physical activity and physiological signals. For example, Smartwatches are commonly used for fitness tracking and can recognize a limited set of exercises like walking, cycling, and swimming. In addition, they provide rudimentary measurements for health metrics such as step count, heart rate variability, energy expenditure, and sleeping hours. Although these features are useful, they still do not provide the user with a holistic view of their daily activities and how their body reacts to them. For example, knowing how many calories we burn is insufficient unless we compared it to our calorie intake.

Through Bedri's research, he bridges this gap by building novel sensing systems that extend the capabilities of regular wearables such as smartwatches, and works on developing wearables with new capabilities to tackle problems like diet monitoring and exercise tracking. He leveraged his background in HCI, embedded systems, signal processing, and machine learning to build end-to-end systems that are resilient to noise and work effectively in free-living environments.

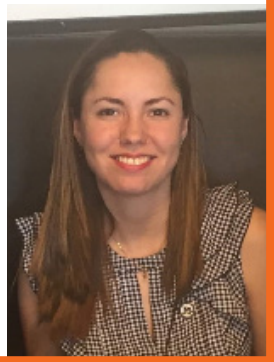
During his presentation, he summarizes efforts in building a suite of wearables to assist in closely tracking a user's diet. Second, he discusses his work on developing effective methods for exercise tracking and activity recognition using instrumented shoes and smart-straps for watches. Additionally, he highlights ongoing efforts for completing the loop and measuring how the user's body reacts to the activities, i.e., a non-invasive, wearable glucose monitor using a multi-modal spectroscopy system.

Kate Gleason College of Engineering

Valentina Nino
Arnaldo Rodriguez-Gonzalez

Valentina Nino

Ph.D. Candidate
Montana State University



Profile

Valentina Nino earned her B.S. and M.S. in Industrial Engineering from the University of Táchira, Venezuela. In 2017, Nino received an M.S. in Industrial and Management Engineering from Montana State University (MSU), where she is now a Ph.D. candidate focused on improving healthcare systems.

Nino's goal is to integrate Industrial Engineering tools and strategies to optimize processes that would translate into a better quality of services and changes in how healthcare services are delivered by making them more efficient, accessible and patient-centered. Her vision is to build a collaborative interdisciplinary and diverse research program in operations management and optimization.

She focuses on developing state-of-the-art analytical models and methodologies that successfully integrate human factors, biomechanics, psychology, decision-making models, discrete event simulation, operation research, and continuous process improvement.

In Venezuela, Nino was an associate professor at the University of Táchira, teaching operations research and simulation courses in the Industrial Engineering Department. She worked in varied industries, including healthcare, exploration and production oil, steel industry, and consulting companies. At Montana State University, she has served as a graduate teaching assistant, graduate research assistant and instructor. Nino is a founding member and second vice president of the Society of Hispanic Professional Engineers (SHPE) MSU chapter, and represents the Industrial Engineering Department as a College of Engineering graduate ambassador. Selected memberships include the Institute of Industrial and Systems Engineers (IISE), Alpha Pi Mu Industrial Engineering Honor Society, The Honor Society of Phi Kappa Phi, and Society of Hispanic Professional Engineers (SHPE).

Nino is committed to supporting the next generation of women and Hispanics in engineering. To do so, she will expand her knowledge in engineering education techniques, strategies and best practices. She promotes the creation of teaching and research activities incorporating diversity, equity and inclusion initiatives. Her goal is to drive effective changes, create positive impacts and learning environments for underrepresented minorities in engineering, while increasing the representation of minorities in engineering fields.

As a professor, Nino intends to integrate active learning strategies and require academic excellence while demonstrating empathy, kindness, and understanding for each student. In her spare time, she loves to do outdoor activities, read biographies, swim and cook.

Abstract

Engineering Process Improvement in Healthcare Delivery Systems

In 2017, the US healthcare system was the most expensive and worst-performing in terms of health access, efficiency and equity. Despite improvements in some areas, it still has too much waste, errors, poor patient outcomes, too little patient-centeredness, and a prohibitively high cost. Nino's research focuses on generating and disseminating groundbreaking theoretical and practical discoveries to transform how healthcare services are delivered by making them more efficient, accessible, and patient-centered.

Nino's research interests span the areas of continuous process Improvement, applied operations research, simulation, decision-making models, optimization under uncertainty, and human factors including biomechanics, ergonomics, cognitive science and user experience. For the past five years, she has led projects at a local hospital, resulting in better practices, new protocols, new workflows and improved layouts. Significant reduction of waiting times, optimization of operating room utilization, reduction of patients complaints, reduction of walking distance, and overall improvement of the work-organizational environment have been achieved.

In the area of decision-making models, optimization under uncertainty, and applied operations Research, Nino has devoted her efforts toward developing a new triage system that incorporates continuous patient monitoring by using wireless wearable devices to improve the decision-making in Emergency Departments, making it a truly patient-centered process. In the area of human factors, ergonomics, and cognitive science, Nino's research aims to benefit people's daily lives by creating safer and stress-free work environments that allow employees to balance mental and physical demands.

The overarching goal is to decrease the risk of developing work-related musculoskeletal disorders. Nino plans to continue developing innovative ways to integrate technology and decision theory to support decision making at the point of care. Furthermore, she plans to continue evaluating factors that can impact performance and workload on employees, investigate factors affecting patient-centered care, and understand gaps between patient expectations of value and healthcare system design. Her goal is to design healthcare facilities to maximize productivity and improve patient's outcomes.

Arnaldo Rodriguez-Gonzalez

Ph.D. Candidate
Cornell University

Profile

Arnaldo Rodriguez-Gonzalez is a fifth-year Ph.D. candidate in Theoretical and Applied Mechanics at Cornell University. Rodriguez-Gonzalez is considered, by-and-large, a theoretician and a computational scientist. He is interested in developing mathematical frameworks to understand "exotic" physical phenomena and then applying those models to solve high-impact problems in engineering.

Currently, Rodriguez-Gonzalez uses dynamical systems theory to understand and engineer dynamic phenomena within microfluidic platforms at the Micro/Nanofluidics Laboratory, directed by Professor Brian Kirby, a research group in the Sibley School of Mechanical and Aerospace Engineering at Cornell University.

Abstract

Engineering Dynamical Behavior with Microfluidic Devices

Some of the most pressing engineering challenges of the day involve transport phenomena in microscale fluid systems; examples include the chemokinetic analysis of potential new medications, composition analyses of pollutants in water/air, and the characterization of cells (both helpful and pathogenic) flowing through the bloodstream. Systems like these are often characterized by strongly nonlinear dynamics as a result of nontrivial multiphysical interactions, countering the expectation of dynamic reversibility brought on by the low-Reynolds number nature of these systems.

Rodriguez-Gonzalez discusses his efforts to describe and manipulate some of these phenomena, particularly emphasizing his work with Prof. Brian Kirby and Prof. Jason Gleghorn on manipulating the dynamics of colloidal particles advecting through obstacle-patterned microfluidic channels for microparticle sorting and immunocapture applications. He shows how the trajectories of these particles can be described in a symbolic dynamics framework. Rodriguez-Gonzalez uses this framework to unify previously disjointed theories on this subject in the literature, and describes an inverse engineering design algorithm constructed with this framework to obtain microchannel designs which vastly improve upon those in the literature.

Additionally, Rodriguez-Gonzalez highlights his current experimental and theoretical works-in-progress, done with Prof. Brian Kirby and Prof. Perrine Pepiot, on constructing a microfluidic platform that systematically predicts the structure of reaction networks using automated design-of-experiments tools.

College of Engineering Technology

Felipe da Silva
Edwin Hernandez, Ph.D.
Kelly Vazquez

Felipe da Silva

Assistant Instructor and Ph.D. Candidate
University of Texas at El Paso

Profile

Felipe B. da Silva is a Ph.D. candidate in the Electrical and Computer Engineering (ECE) Department at the University of Texas at El Paso (UTEP). Currently, he is appointed as an assistant instructor for the online course Probability Applied to Engineering and Science at UTEP. He received an M.S. and a B.S. degree in Mathematics at the University of Brasilia, Brazil.

As a Ph.D. candidate, da Silva teaches several courses such as Electric Circuits I and II, Lab for Electric Circuits, Signals and Systems, Probability, and seminar for freshmen. Besides duties as assistant instructor, he collaborates with professors in the ECE Department as a teaching assistant or tutor. As an adjunct professor he taught Calculus I, Calculus II, Ordinary Differential Equations, and Mathematics.

da Silva has research interests in both Engineering and Mathematics disciplines in fields such as signal processing, wireless technologies, compressive sensing, numerical optimization, cryptography, discrepancy theory, group theory, information theory, and big data. He also likes teaching as research based on active and blended learning techniques.

He is a member of IEEE, SIAM, and honor societies such as Alpha-Chi, and Golden Key. da Silva has been awarded scholarships by Texas Instruments Foundation and Pan American Round Table of El Paso. He has published five conference or journal papers either as first author or co-author. He has a passion for teaching by helping students achieve their goals, and to research by contributing to science development, new technologies and his own learning.

Abstract

Golden Sampling Applications in Compressive Sensing

Compressive sensing is a technique in signal processing that allows someone to reconstruct sparse signals from fewer linear measurements. There are applications in astronomy, tomography, MRI, and cyber-physical systems just to mention a few. The advantage of the technique is to reduce the number of acquired measurements, such as X-ray projections, without damaging the reconstruction of the signals or images of interest.

The mathematical model is designed in terms of underdetermined linear systems y=Ax, which have infinite many solutions. However, with the additional hypotheses that the signals x to be reconstructed are sparse, and the sensing matrix A holds the restricted isometry property, it is possible to find a unique (sparsest) solution of the linear system by numerical optimization methods.

In this work da Silva takes, as sensing matrix, a submatrix of the discrete Fourier Transform (DFT) - only some rows of the DFT are taken. But, the frequencies of the sensing matrix can be chosen continuously in the unit interval. He proposes a sequence of points that define those frequencies, named golden sequence, which defines the golden sampling. Such sequence is a particular case of the class of Kronecker sequences, and is defined as the fractional parts modulo 1 of multiples of the golden number.

The golden sampling has peculiar properties that allows someone to reconstruct sparse signals in compressive sensing problems. In this case, the sensing matrix is the modified DFT, whose frequencies follow a subsequence of the golden sequence. Our results show that such sampling scheme is irregular but share similar properties with regular Cartesian sampling. The quality of signal reconstructions by using golden sampling, in terms of signal-to-error ratio, is as good as sampling over a Cartesian grid.

In addition, golden sampling implies higher signal-to-error ratio in the signal reconstruction when compared with random sampling - frequencies of the DFT are random numbers chosen with uniform distribution in the unit interval. We present a formulation of a compressive sensing problem. Then some signals are reconstructed by means of convex algorithms by using those three different sampling schemes: Cartesian sampling, golden sampling, and random sampling. Finally, da Silvia shows how the signal-to-error ratios of the reconstructed signals compare to each other.

Edwin Hernandez, Ph.D.

Owner, EGLA Corp.

Profile

Edwin Hernandez owns a startup incubator called EGLAVATOR and his company EGLA CORP. He has assisted startups with cloud-based platforms, filed for several patents and has been issued 12 patents, assisted the Industry Advisory Board at Florida Atlantic University, served as reviewer for several IEEE conferences and editorial boards for journals. Hernandez is a very hands-on engineer and researcher with expert witness consulting projects in telecommunications and computer engineering cases with clients such as Citrix, Bank of America, AT&T, and many others. He is an expert in Machine Learning for media platforms, media and cloud platforms, 4G and 5G systems, and an avid programmer in multiple languages.

Hernandez earned his Ph.D. in Computer Engineering and his M.S. in Electrical and Computer Engineering both from the University of Florida. He received his B.S. in Electronics Engineering from Costa Rica Institute of Technology.

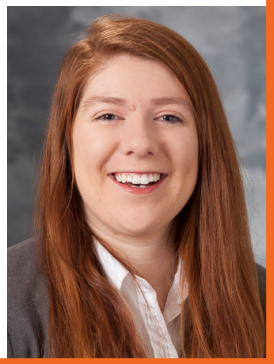
Abstract

Deep Learning for HTML Content Generation Form MMTP for ATSC 3.0 In the NEXTGEN TV Standard

TV and podcasting are merging on the web, but not so on TV Broadcasting. The rising FCC rulings on IPTV Broadcast platforms, as NEXTGEN TV and 5G provides a new arena that interfaces cloud-based techniques and video broadcasting. The solution provides a way to create HTML widgets that are embedded as part of the transmission and can be changed based on deep learning and machine learning algorithms. The generated video is able to be broadcasted using MMTP frames and ROUTE protocols, results on combining dynamic widgets and HTML 5.0 content generation will be presented.

Kelly Vazquez

Ph.D. Candidate and Graduate Research Assistant
University of Wisconsin – Madison



Profile

Kelly Vazquez is a 5th year Ph.D. candidate in Mechanical Engineering at the University of Wisconsin – Madison and will complete her Ph.D. in the summer of 2021. Vazquez is a Graduate Engineering Research Scholar (GERS) and a NIH-funded TL1 Pre-doctoral Trainee. As a result of her TL1 training grant, Vazquez is completing a minor in Clinical Investigation and a certificate in the Fundamentals of Clinical Research during her PhD. Her current research focus is studying the cellular mechanics of wound healing under the supervision of Dr. Jacob Notbohm.

Originally from Chicago, Vazquez completed her B.S. in Physics at North Central College. While at North Central, she served as a high school physics teacher at schools in the inner-city of Chicago. The central theme of her undergraduate, and now graduate, career has been to promote and support the number of minorities entering STEM fields. Throughout her undergraduate career, Vazquez conducted research at both Fermi National Accelerator Laboratory and Argonne National Laboratory. These research experiences motivated Vazquez to pursue engineering with clinical applications for her Ph.D. work at UW-Madison.

In May 2018, Vazquez received her M.S. in Mechanical Engineering. Also, in 2018, she was a recipient of the NSF Graduate Research Fellowship Honorable Mention. Vazquez is a member of the GERS Fellowship at UW-Madison which was created with the distinct vision of aiding more minority students in becoming professors at research-focused universities across the country. She serves on both the recruiting and outreach committees.

Her career goal is to become an independent investigator in Mechanical Engineering with translational research focusing on cellular mechanics. Completing the Ph.D. will enable her to fulfill her dream of working in the field of biomechanics and inspiring more women and minorities to pursue a career in translational science.

Abstract

Role of Cellular Forces on Collective Keratinocyte Migration during Wound Healing

Chronic wounds are an important challenge in health care as they account for over $25 billion in health expenditures per year. Additionally, chronic wounds plague already vulnerable health populations with underlying conditions such as diabetes or obesity. Thus, unfortunate outcomes for individuals with chronic wounds can often result in limb amputation and reduced quality life.

Chronic wounds occur due to a failure in keratinocytes to close a wound and heal. From a physics perspective, this inability for cells to migrate and lack of motion can be attributed to a failure in the underlying cell-generated forces which drive keratinocytes to close the wound. The relationship between cell forces and their resulting motion is not fully understood. We hypothesize that alteration of the underlying cell mechanics can be done by geometric and pharmacologic interventions. During migration of a confluent sheet of cells, cells move from a solid-like state to a fluid-like state. This phase transition in cell motion has been referred to as a transition from a jammed to unjammed state.

Results show that the geometry of the wound boundary can result in a jammed state of cells as they have inability to rearrange and result in a change in the cell shape. Epidermal growth factors (EGF) such as heparin-binding EGF-like (HB-EGF) have been shown to illicit changes in the proliferation and migration rate of human keratinocytes. The addition of HB-EGF to keratinocytes has a significant effect on the cellular rearrangements, cell trajectory, and migration. The central objective of this work is to illicit changes in the cell motion of keratinocytes and quantify the role of cell-generated forces.

Here we attempt to manipulate the wound closure rate of keratinocytes by engineering the mechanical boundary conditions of the wound and affect the resulting cell motion. We use traction force and monolayer stress microcopy methods to quantify the tractions and stresses to determine the relationship between mechanical forces and wound closure rate. We also use innovative design metrics and pharmacologic interventions to perturb the transition between jammed and unjammed keratinocytes to accelerate wound healing.

Collectively, we will connect the relation between cell-substrate tractions and cell-cell stresses to keratinocyte migration. This work will provide clinician and scientist's context of the role between wound boundary and resulting cell motion in order to create interventions that accelerate wound healing. Ultimately, these findings will have broad implications for future design of wound dressings and topical wound treatments.

College of Health Sciences and Technology

Ruth Pobee, Ph.D.
Cordero Roche

Ruth Pobee Ph.D.

Senior Research Specialist
University of Illinois

Profile

Ruth Pobee received her Ph.D. in Nutritional Sciences from Penn State University, and completed a Postdoctoral assignment with Michigan State University. Pobee was recently named as a Senior Research Specialist within the Emergency Medicine Department at the University of Illinois.

Pobee is a dynamic and motivated professional with 15+ years of health-related research experience and specialization in maternal and child nutrition, micronutrient deficiency (iron deficiency), psychosocial assessment, growth assessment, community outreach and development and international nutrition programs. She is passionate about conducting research to inform health related interventions in underserved communities.

Abstract

Is Iron Status Related To Psychosocial Wellbeing During Pregnancy?

Although pregnancy may pose an increased risk for both iron deficiency and negative psychosocial wellbeing, very little information is known about the relation between iron deficiency and psychosocial wellbeing during pregnancy. This study sought to understand the relationship between iron status and psychosocial wellbeing throughout pregnancy.

A longitudinal study was conducted among pregnant women in Central Region of Ghana. Women were recruited in their 1st trimester (< 13 weeks; n=119) and followed at their 2nd (n=73) and 3rd (n=72) trimesters. Sociodemographic variables, food security (8-item version of US Household Food Security Survey Module), anxiety (Beck Anxiety Inventory; BAI), and depressive symptoms (Center for Epidemiological Studies-Depression Inventory; CESD) were collected. Hemoglobin (Hb) concentrations were determined via Hemocue; ferritin (Ft) via ELISA; serum iron and total iron binding capacity via colorimetric methods and calculated transferrin saturation (TSAT).

The prevalence of iron deficiency and negative psychosocial outcomes were determined at each trimester. Stepwise regression models were used to determine predictor of psychosocial outcomes at each trimester. The association between iron status and psychosocial outcomes over time using difference-in-difference analyses.

Participants were 27.1 ± 5.2 years old. Prevalence of anemia (Hb<11.0 g/dL) was 36%, 66%, 54%; ID (Ft<15 µg/L) 15%, 20%, 37%; ID anemia 6%, 12%, 25%; depressive symptoms (CESD≥16) 48%, 34%, 29% and anxiety symptoms (BAI≥16) 34%, 11%, 2% for 1st, 2nd and 3rd trimesters, respectively. We found that iron status in the 1st trimester is important in predicting psychosocial health in the 2nd and 3rd trimesters. We also found Ft improvers decreased in their depressive symptoms and compared to Ft non-improvers, while serum iron non- improvers decreased in anxiety symptoms compared to serum iron improvers.

This study contributes to the evidence that iron status is related to psychosocial outcomes and has added to the scarce literature on the relation during pregnancy. Iron status at the beginning of pregnancy is important in predicting depressive and anxiety symptoms. However, given the small sample size in this study, larger studies are needed to confirm this relation.

Cordero Roche

Ph.D. Candidate
University of Nevada Las Vegas

Profile

Originally from Florida, Roche graduated from Troy University in 2012 with a B.A.in Broadcast Journalism. In 2014 he earned a NSCA-CSCS certification and worked as a personal trainer. Later in 2015 he interned for the strength and conditioning staff at Florida International University.

After the completion of the internship, Roche returned to Troy University to complete an M.S. in Exercise Science. At Troy University, he worked alongside the strength and conditioning staff for the university's athletic program. Upon completion of the his master's degree, Roche began his Ph.D. studies at The University of Nevada – Las Vegas where he is majoring in Interdisciplinary Health Sciences with a focus in Biomechanics.

Roche is currently a 4th year Ph.D. candidate with a strong passion for sports science, and ready to lead a well-structured lab environment. Roche's research interest lies around investigating asymmetry during plyometric performance.

Abstract

Investigation of Whether or Not Asymmetry During Jumping is Influenced by Gender and Relationship of Jump Performance Between Biomechanical Asymmetry

Vertical jumps are typically used to assess the effectiveness of an exercise or rehabilitation training program. It is commonly expected for both legs to contribute equal characteristics otherwise known as symmetry during bilateral jumping performance. If observed characteristics are uneven this is known as asymmetry and this could have a negative impact performance. There is a paucity of research on whether asymmetry for different jumping phases for various plyometric jumping exercises and how this could also affect gender.

Therefore, the aim of this study was to compare asymmetry between different jumping types, jumping phases and gender. Ten participants (4 females, 6 males) were recruited and upon arrival participants had their weight, height, age and body composition recorded. Participants had 42 reflective markers placed on their dominant and nondominant leg. They were allowed up to 10 minutes of a self-selected warmup prior to testing.

The testing procedures required the participants to perform three trials of a bilateral countermovement jump (CMJ) and drop jump (DJ). DJ were initiated from a 30.5 cm box where the participants stepped off leading with their dominant leg. Dominant leg was identified as the leg used to kick a ball as far as possible. Participants landed with each foot landing individually on separate force platforms. Dependent variables that were calculated were ground reaction force (GRF) asymmetry, rate of force development (RFD) asymmetry and impulse asymmetry for jumping and landing phases during each jump. RFD and impulse were calculated from when GRF was at lowest to peak right before takeoff during jumping phase. For landing phase, the variables were derived from initial contact when GRF exceeds 20N to peak on GRF profile. Asymmetry was calculated using the following formula: (dominant leg – nondominant leg / dominant leg + nondominant leg) *100. A 2 (jump type) x 2 (jump phase) x 2 (gender) analysis of variance (ANOVA) was used for our statistical analysis.

Our results determined that there was no interaction between jump type, jump phase and gender for GRF asymmetry, RFD asymmetry and impulse asymmetry ($p>0.05$). No interaction was observed between jump phase and gender or jump type and gender for GRF asymmetry, RFD asymmetry, and impulse asymmetry ($p>0.05$). There was an interaction between jump type and jump phases for impulse asymmetry ($p<0.05$), but not for GRF asymmetry and RFD asymmetry ($p>0.05$). These findings determined gender has no impact on asymmetry for different jumping types and phases.

National Technical Institute for the Deaf

Janne Hall

Janne Hall

Ph.D. Candidate
Jackson State University

Profile

Janne Hall is currently ABD status at Jackson State University in the Electrical and Computer Engineering doctoral program. She received an M.S. in Computer Science and a B.S. in Electrical Engineering Technology, both from Texas Southern University. Her research title is Development of Cloud-Based Model to Implement a Scalable System of Electrical and Computer Engineering Virtual labs.

Abstract

Virtual-Our New World

Virtual instrumentation used in academia affords educational opportunities that are otherwise nonexistent or inaccessible to those desiring a degree in electrical engineering, but with constraints to physical access to the applicable laboratory facility.

The purpose of Hall's research is the simulation of a fully online electrical and computer engineering program meeting the hands-on laboratory experience required for students to satisfy the laboratory requirements for graduation. The virtual instrument used to create the virtual labs in the research is Analog Discovery, and this is used to develop an innovative tool that provides a ubiquitous laboratory experience that could become an essential aid for teaching the technical aspects of electrical engineering program. Analog Discovery simulates DC Power Supply, Function Generator, Voltmeter, Oscilloscope, Network Analyzer, Logic Analyzer, and additional equipment; thereby replacing traditional lab equipment for the Digital Logic, Electronics, and Alternating and Direct Current Circuit labs.

The implementation of a 100% online computer and electrical engineering laboratory program would undoubtedly strengthen institutional existing capability, and it would be most beneficial to engineering students.

College of Science

Javier Jaimes, D.V.M., Ph.D.
Chartese Jones, Ph.D.

Javier Jaimes, D.V.M., Ph.D.

Postdoctoral Associate
Cornell University

Profile

Javier Jaimes is a veterinarian and virologist, working in research and education. Jaimes is currently a Postdoctoral Associate in the Department of Microbiology and Immunology, College of Veterinary Medicine, Cornell University. He earned his Ph.D. in Microbiology from Cornell University. Additionally, he received his D.V.M. and M.S. degrees from the Universidad Nacional de Colombia, and an M.B.A. from Universidad de La Salle, both of Colombia.

His professional career has focused on the study of viruses; principally those infecting humans and domestic animals. He has 15+ years of experience (including 6 years as faculty) investigating virus-host interactions, viral pathogenesis, viral evolution, and vaccine development. His research focuses on the understanding of the mechanisms used by coronaviruses to enter into the host cells; principally studying the molecular and biochemical events that allow the virus to start the cellular infection. Jaimes is currently studying the pathogenesis of the SARS-CoV-2, which is the virus behind the COVID-19 emergency.

His future interests are to develop a successful career in academia and establish his own laboratory, to carry out the two activities that he enjoys most: research about viruses and mentoring future colleagues. Aside of the academia, Jaimes enjoy long and meaningful conversations with friends about interesting and diverse topics; and spending time with his wife and two pets: a rescued dog called Tango and a Siberian cat called Maximilian.

Abstract

Coronavirus Infection: Unveiling the Viral Entry Pathways into the Host Cell

Coronaviruses (CoVs) are a group of infectious agents known for causing disease in humans and animals. These viruses are extremely diverse, and usually take advantage of wild reservoirs to facilitate evolution. CoVs are frequently involved in spill over events where viruses jump to new species, occasionally causing epidemic crisis.

The CoV replication cycle, starts with the viral binding to a susceptible cell, which triggers a series of molecular events, leading to the fusion between the viral and the cell membranes, and the subsequent release of the CoV genetic material into the cytoplasm. The mechanisms used by CoVs to induce the viral entry, are usually assessed as targets for drug discovery and antiviral therapy.

However, these mechanisms are complex and frequently vary from one CoV to another, hindering the development of universal therapies to treat infections. Among CoV's proteins, the spike is the major viral regulator for entry processes. This protein is divided in two subunits S1 and S2, the former harboring the receptor binding domain (RBD, which is interacts with the cellular receptor for viral binding, and the later enclosing the fusion domain, which drives the viral-cell membrane fusion steps.

During the past 18 years, our laboratory has studied the CoV spike and the molecular pathways used by this protein to facilitate viral entry. We have focused in the unveiling of the entry mechanisms , especially those related to the membrane fusion events in several CoVs including the feline coronavirus (FCoV), the severe acute respiratory syndrome coronavirus (SARS-CoV), the Middle East respiratory syndrome coronavirus (MERS-CoV), and recently, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is causing the COVID-19 pandemic. Our studies have allowed the understanding of the biochemical conditions leading to membrane

Chartese Jones, Ph.D.

Assistant Professor
California University of Pennsylvania

Profile

Chartese Jones received his Ph.D. and M.S. in Mathematics and Statistics from Mississippi State University (MSU), and his B.S. from Mississippi Valley State University (MVSU). During his time as an undergraduate student, he had the opportunity to do research and present his finding for Indiana University at Bloomington, Elizabeth City State University, and MVSU. From these experiences, he realized that he wanted to teach and do research.

He has taught Calculus 1, Pre-Calculus, Trigonometry, College Algebra, Intermediate Algebra, and Business Calculus. These experiences gave him a big opportunity to shape the minds of the future, creating critical and independent thinkers. Jones received the 2017 Graduate Teaching Assistant for Mathematics and Statistics Department at MSU, and was nominated for the 2019 Donald Zacharias Graduate Teaching Assistant Award – the highest teaching assistant award at MSU.

During Jones' Ph.D. studies, he worked on the development of efficient and accurate image denoising methods using non-linear partial differential equations (PDE) and filtering techniques with his Ph.D. advisor, Dr. Hyeona Lim. He developed edge enhancing accelerated diffusion model for speckle denoising and this result was published in 2018. A quarter block non-local means filtering based methods for accurate denoising was studied and is being submitted for a journal publication. Additionally, he developed a speckle denoising algorithm based on Chambolle's dual approach.

After obtaining his Ph.D. Jones has stepped back into the classroom to help make a difference in students' lives. It was not until he entered college did he understand the importance of an education. He is an advocate for summer programs, because the area he grew up in does not have anything constructive for the children to participate in during the summer. Jones hopes to help others tap into their full potential and to help students understand how important they are to the world. He wants to learn as much as possible, so when his work is done, he will have touched enough hearts and souls that have the skills and abilities to replace him.

Abstract

Speckle Image Denoising Methods Based On Total Variation and Non-Local Means

Speckle noise occurs in a wide range of images due to sampling and digital degradation. Understanding how noise can be present in images have led to multiple denoising techniques. Most of these denoising techniques assume equal noise distribution. When the noise present in the image is not uniform, the resulting denoised image becomes of less than the highest standard or quality.

The Non-local Means (NLM) filter restores every pixel in the original image by computing a weighted average of Non-local neighborhoods using a robust similarity measure. The NLM algorithm takes advantage of the high degree of redundancy of any natural image. Also, the NLM algorithm is very accurate since all pixels contribute for denoising at any given pixel. However, due to Non-local averaging, one major drawback is computational cost.

For this research, Jones will discuss new denoising techniques based on NLM and total variation for images contaminated by speckle noise. We introduce blockwise and selective denoising methods based on NLM technique and Partial Differential Equations (PDEs) methods for total variation to enhance computational efficiency. PDE methods have shown to be very computational efficient and as mentioned before the NLM process is very accurate. We are wanting to combine these methods to show a more efficient and effective denoising method for speckle noise.

Golisano Institute for Sustainability

J. Leah Jones

J. Leah Jones

Ph.D. Candidate
Arizona State University

Profile

Leah Jones is a Ph.D. candidate in Sustainability at Arizona State University. Jones received a B.S. in Environmental Science from the University of Virginia, and an M.S. in Sustainability from Arizona State University.

Jones' dissertation research focuses on understanding the impacts of urban water scarcity on the intersections of food-energy-water nexus governance for integrated decision-making and increased resource security. Focusing on the cases of Phoenix, Arizona, and Cape Town, South Africa, Jones employs stakeholder analysis, social network analysis, and case study approaches to investigate natural resource governance.

Abstract

Impacts of Urban Water Crisis on the Food-Energy-Water Nexus

The food-energy-water (FEW) nexus refers to the interactions, trade-offs, co-benefits, and relationships between the three resources and their related governance sectors. With strong interlinkages between these resources, decisions made in one sector can impact the other two. Thus, integrated FEW nexus decision-making and governance can help to manage uncertainties, reduce unintended consequences, and enhance sustainability within the system.

Despite the proposed benefits of integrated decision-making, many decisions within food, energy, and water sectors continue to be made in "silos," with limited consultation across sectoral boundaries. This can lead to fragmented knowledge and incoherent policy, exposing the linked systems to vulnerabilities, uncertainties and external shocks. Increased scholarship is needed to understand the nature of FEW nexus governance and barriers that inhibit collaborative governance of integrated FEW resources.

Jones' research conducts a stakeholder analysis of food, energy and water actors in the metropolitan region of Phoenix, Arizona, to understand the structure of collaborative governance across the three sectors, investigate the structures that uphold the "silo" mentality to decision-making, and identify opportunities for greater collaboration across the sectors. As a region with numerous strong interconnections between food, energy and water resources, the Phoenix metropolitan area presents a unique case study on interactions of FEW nexus governance.

For this analysis, Jones first conducts a social network analysis of stakeholders in the region using secondary data to identify the level of cohesion within and between the sectors. Then, she conducts an exploratory case study of FEW nexus governance to qualitatively understand the network structure, the barriers that prevent greater cohesion between the three sectors, and the drivers that reinforce siloed decision-making. The results revealed water actors are most central to the network, with strong cohesion within the water sector and moderate collaboration of energy and food actors with water stakeholders. However, there is minimal collaboration between energy and food stakeholders. This emphasizes an opportunity for water actors to be bridges between energy and food sectors to facilitate full FEW nexus collaboration in governance.

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