THE FOUR SEASONS

The SBU Graduate Arts & Sciences Magazine

Volume 2, Issue 1

Spring 2025

Cover Illustration by Laiba Mahmood
Pages 3-5 Illustration by Laiba Mahmood
Cover Art Conceptualization by Jennifer L. O’Connor
Photographs by Ava Nederlander and Dennis Jourdain
Photographs courtesy of Mohammad Fauzan, Natalie Alfano, Maryam A. Azmi, Brittney Scannell, Courtney Kidd, Junghee Lee, Zijin Mei, Abdul Wasay, Carl Safina, Mark Aranoff, Rupert Ikeh, Florence Aghomo, and Elsie Otieno
Special thank you to our sponsors: Graduate Student Organization, Institute for Advanced Computational Science, and Department of Student Community Development
Printing: Qualprint Inc.

Fair Use Notice

The SBU Graduate Arts & Sciences Magazine is a student publication. The opinions represented are those of the writers. Stony Brook University is not responsible for the accuracy and contents of *The SBU Graduate Arts & Sciences Magazine* and is not liable for any claims based on the content or views expressed herein. The Editorial Board makes all editorial decisions regarding grammar, content, and layout. All queries and complaints should be directed to the Executive Editors.

This publication contains or may contain copyrighted material, the use of which has not always been specifically authorized by the copyright owner. We are making such material available in our efforts to advance understanding of issues of scientific significance. Our belief in the use of this material constitutes what we consider “fair use” under Title 17 U.S.C. Section 107, aiming for research and educational purposes. This publication is distributed without profit.

It is important to note that fair use is a highly specific legal doctrine, contextually dependent on the particular use, including the nature of the copyrighted work, the amount used, and its impact on the market for the original work. As such, not all uses of copyrighted material for educational purposes will automatically qualify as fair use. Each instance is considered on a case-by-case basis.

Illustration by Laiba Mahmood

Table Of Contents

Letter From The Editors

Dear Readers,

Welcome to the second edition of The SBU Graduate Arts & Sciences Magazine (GradMag)!

Founded with the mission of showcasing academia and research across the arts and sciences, our magazine strives to make these disciplines accessible and engaging for a broad audience.

The theme for this edition, The Four Seasons, serves as both a tribute to Antonio Vivaldi’s famous concerto and a reflection on the cyclical nature of change—mirroring the real-life experiences of graduate students. Just as Vivaldi captured the spirit and transformation of each season through music, this theme invites contributors to explore the evolving stages of their academic and personal journeys.

Graduate school is marked by shifting paces, moods, and milestones: periods of inspiration and productivity, moments of quiet introspection, and the inevitable challenges that foster resilience. Like the changing seasons, from the vibrancy of spring to the stillness of winter, the graduate experience unfolds in movements, each with its own tempo, tone, and purpose. Spring represents the excitement of new ideas and beginnings; summer, the intensity and heat of progress; autumn, a time of reflection and harvest; and winter, a period of rest, recalibration, and sometimes uncertainty. These cycles are not only seasonal but deeply metaphorical, capturing the ways graduate students grow, adapt, and reinvent themselves as scholars, artists, and professionals.

Echoing Vivaldi’s ability to explore each season through music, we too celebrate how these cycles influence our creativity, perspectives, and scholarly pursuits. Spring inspires resilience and renewal, encouraging us to welcome fresh ideas and opportunities. Summer radiates passion and intensity, inviting bold exploration and joyous celebration. Autumn embodies transformation, teaching us the beauty of change and the courage to let go. Winter offers moments of introspection, clarity, and quiet preparation.

As each season brings its own distinct beauty, the diversity of talent at Stony Brook University is unmatched—vibrant, multifaceted, and continually inspiring.

We invite you to explore these seasonal reflections and discover how Vivaldi’s piece resonates with the unique academic and artistic contributions of our community.

We hope you enjoy the magazine!

Warmly,
Ava Nederlander and Jennifer L. O’Connor
Co-Executive Editors

Executive Board

Founder/President: Ava Nederlander
Vice President: Jennifer L. O'Connor
Secretary: Veronica Borracci
Treasurer: Sai Ram Kasanagottu
Media Director: Rachel Deahl Kostelnik
Managing Editor: Narmin Mekawy
Programming & Logistics Coordinator: Esther Nosazeogie
Human Resources Manager: Dennis Jourdain
Communications Coordinator: Amanda Sirna
Music Director: Octavio Deluchi

Editorial Board

Executive Editors: Ava Nederlander, Jennifer L. O'Connor
Managing Editor: Narmin Mekawy
Art Director: Laiba Mahmood
Editors: Manasa Kumari, Viviana Leo, Esther Nosazeogie
Writers: Maxaie Belmont, Nina Cintron Pregosin, Rachel Deahl Kostelnik, Mohammad Fauzan, Caitlin Hetherington, Haaris Khan, Alexander Kwakye, Abdul Wasay Lnu, Laiba Mahmood, Narmin Mekawy, Ava Nederlander, Jennifer L. O'Connor, Esther Nosazeogie, Shiqi Wang, Wangshu Wen
Poetry Editor: Amanda Sirna
Artists: Manahil Chaudhry, Ming-Wei Chou, Ariel Nieves, Ria Rajan, Gina Rizzo, Amanda Sirna, Kejia Xie
Cartoonists: Tamor Khan
Poets: Cartney Bazile, Mahnoor Fatima, Dana Golden, Peggy Grigonis, Steven Lewis, Melanie Nelson, Allyson C. Sheneman, Danial Vahabli



Size

By Steven Lewis

Like the atom,
the mind is mostly
empty space and
yet, it can be
so much more.

A beam of light.
A wall buffeting against
the onslaught of consciousness,
Experience, Others, the World.

What is a limb, if not
a cloud of electrons and
Consciousness itself.
A wave of ions
(charged particles like those produced between
not yet lovers, waiting at the edge of expectation,
fear, and wholeness)
traveling faster than our minds can
Comprehend.

Yet laying the foundation,
brick by brick
of the mind itself.

The small produces the large.
Is the large anything but small?

Fall

Illustration by Kejia Xie

About The GradMag

By the GradMag Editorial Team

(Above) GradMag Executive Board members Sai Ram Kasanagottu, Laiba Mahmood, Veronica Borracci, Ava Nederlander, Jennifer L. O’Connor, Narmin Mekawy, Rachel Deahl Kostelnik, and Esther Nosazegie.

This past academic year has been extraordinary for GradMag, marking significant milestones, achievements, and community impact. As Stony Brook University’s first interdisciplinary, graduate student-led organization, GradMag has rapidly become a central hub for intellectual exchange, creative expression, and community-building among graduate students from more than 30 academic departments.

Founded with the ambitious mission of promoting interdisciplinary dialogue and scholarly exploration, GradMag has succeeded beyond expectations. In May 2024, we published our first magazine, “The Human Connection,” showcasing compelling research, artwork, and literary pieces from graduate students across diverse fields. This debut publication set a high bar, reflecting our commitment to rigorous editorial standards and vibrant creative expression. Anticipation continues to grow for our second issue, due in May 2025, promising to further deepen our campus community’s interdisciplinary engagement. We have hosted numerous, including for the start of the semester with speakers from the Career Center and the Department of External Fellowships.

A highlight of our year was the highly successful BRIDGES Cross-Departmental Graduate Student

Conference, held in January 2025. BRIDGES attracted over a hundred graduate students, featured 63 research poster presentations, a curated art gallery, dynamic musical performances, engaging short film screenings, and seminars from prominent campus figures, including Provost Carl Lejuez and experts from the Alan Alda Center for Communicating Science. This unprecedented event not only showcased cutting-edge research but also forged enduring interdisciplinary connections among participants, significantly enhancing campus cohesion and community pride.

Integral to our success were the enthusiastic new members who joined our team this year, contributing fresh ideas, expertise, and dedication. Narmin Mekawy, our new Managing Editor, joined just two months before BRIDGES and immediately made an impact by overseeing comprehensive editorial processes, ensuring our publications maintained high-quality standards. Narmin introduced innovative strategies that increased content accessibility, reader engagement, and significantly improved overall editorial cohesion. Her mentorship empowered the editorial team, fostering their professional growth and elevating the magazine's academic and creative standards.

Another key addition was Rachel Deahl Kostelnik, who joined GradMag as Media Director during her first year as a PhD student. Rachel revitalized our social media presence, redesigned our online presence that unified our visual identity. Her designs for promotional materials were essential in driving attendance and visibility for BRIDGES and other GradMag events. Rachel also undertook a comprehensive website redesign, enhancing user experience and aligning promotional strategies across all digital platforms.

Dennis Jourdain, our new PR Manager, has significantly boosted GradMag's recruitment efforts and expanded our visibility. He played an essential role in engaging new members, organizing promotional activities, and collaborating closely with our editorial and creative teams to support magazine production. Dennis's enthusiasm, attention to detail, and strong organizational skills have greatly enhanced our operational

(Above) GradMag Secretary, Veronica Borracci, and GradMag Vice President, Jennifer L. O'Connor, stand next to GradMag's table at the Fall 2024 Student Activities Fair.

effectiveness, contributing positively to both member experience and audience engagement.

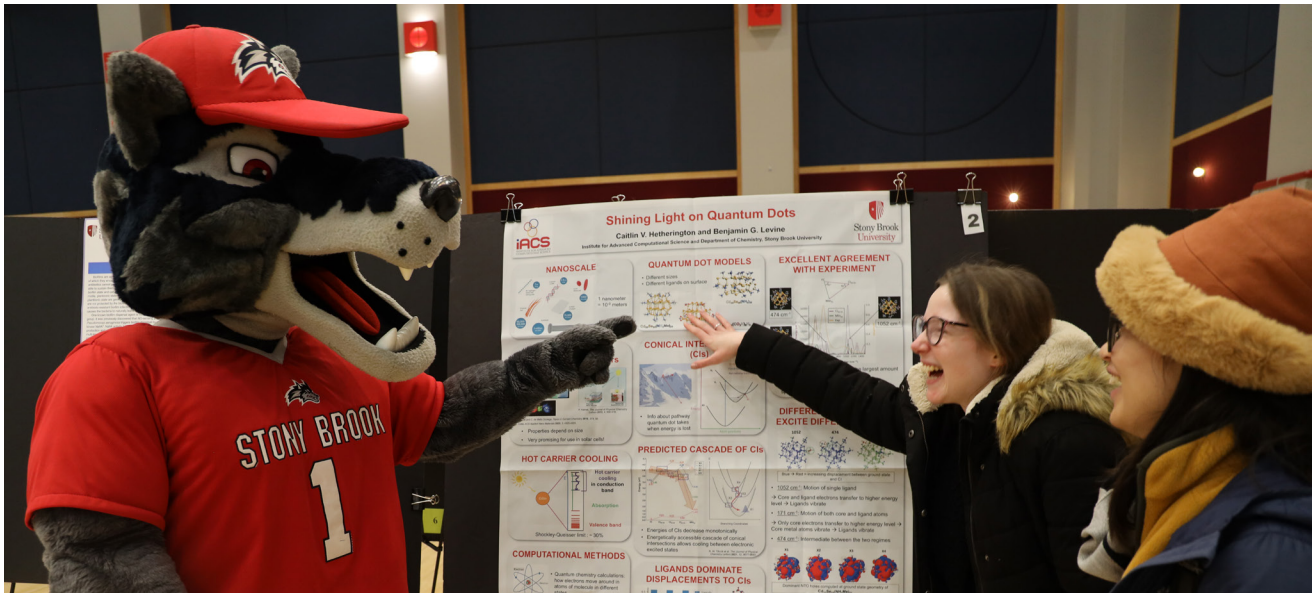
Throughout the year, GradMag cultivated a vibrant community by hosting nuemerous interdisciplinary events. Regularly scheduled poetry readings, storytelling nights, and open mic sessions provided graduate students platforms to share their talents, fostering a supportive atmosphere of creativity and openness. These gatherings highlighted the diverse skills within our graduate community, significantly contributing to personal growth, confidence, and the development of communication skills among participants.

Our sustained efforts to engage with multiple departments and campus groups have resulted in a broad, inclusive network. Collaborations with entities such as the Alan Alda Center, Graduate Student Organization, and numerous academic departments significantly amplified our outreach and effectiveness. These partnerships facilitated cross-campus collaboration, ensuring GradMag's events consistently drew diverse, enthusiastic audiences.

Reflecting on our substantial achievements this past year, we proudly celebrate the community we have built and the interdisciplinary connections we have nurtured. GradMag's journey has significantly enriched graduate student life at Stony Brook University, and we are excited to continue this trajectory of growth, creativity, and community-building into the future.

B.R.I.D.G.E.S Conference:
Fostering Interdisciplinary Collaboration

By the GradMag Editorial Team



(Above) Wolfie poses with Caitlin Hetherington at her poster.

The inaugural BRIDGES (Building Research Interdisciplinarity and Dialogue for Graduate Exchange and Scholarship) Conference, held on January 30, 2025, at Stony Brook University, was a groundbreaking and inspiring celebration of interdisciplinary collaboration and graduate scholarship. Hosted by the SBU Graduate Arts & Sciences Magazine, this all-day event brought together more than 200 attendees and featured contributions from over 30 graduate departments and programs across the university. With an ambitious vision to promote cross-disciplinary dialogue, creativity, and intellectual community, BRIDGES represented a major step forward in fostering collaboration across traditionally siloed academic fields.

Graduate Research Presentations

The event featured 63 graduate research poster presentations that spanned a wide range of disciplines, including the sciences, engineering, humanities, social sciences, and the arts. Graduate students presented original research projects that tackled complex global and local challenges, explored innovative scientific methodologies, and engaged deeply with theoretical, computational, and cultural questions. Projects in chemistry focused on quantum dots and ligand exchange in nanoclusters, while physics presentations explored topics like atom-ion clusters and van der Waals Rydberg trimers. Researchers in marine and atmospheric sciences examined environmental phenomena such as wildfire smoke, hurricane inundation, and shark tracking, while those in pharmacological sciences and neurobiology delved into cutting-edge topics like microgravity effects on bone cells and the neural mechanisms of stress-induced depression. Posters in the social sciences and humanities addressed a diverse set of topics, from the effects of school violence on immigrant children to the influence of art, music, and language on society.

Among the many poster presentations, several projects stood out for their innovation and clarity. Mohammad Fauzan from the Department of Molecular and Cellular Biology was recognized for his project titled “Astrocytic FABP5 Mediates

Endocannabinoid Transport at Hippocampal Synapses." Other notable presenters included Gurulakshmi Subramanian (Physics and Astronomy), Ramsha Shoaib (Medical Humanities, Compassionate Care, and Bioethics), Jeanai La Vita (Music), Maryam Azmi (Genetics), Jennifer Tepan (Psychology), and Hossein Seyedzadeh (Civil Engineering). The judging panel, composed of nine faculty from a variety of departments, assessed posters on criteria such as visual clarity, engagement with interdisciplinary audiences, and the originality of the research presented.

"This conference is a testament to the power of graduate students," said Celia Marshik, Dean of The Graduate School and Vice Provost for Graduate and Professional Education.

Departments represented at the conference included Africana Studies, the Alan Alda Center for Communicating Science, Applied Mathematics and Statistics, Art, Business (MBA), Chemistry, Civil Engineering, Computer Science, Economics, Ecology and Evolution, Electrical and Computer Engineering, English, Film and TV, Genetics, History, Linguistics, Marine and Atmospheric Sciences, Materials Science and Chemical Engineering, Mechanical Engineering, Medical Humanities and Bioethics, Molecular and Cellular Biology, Music, Neurobiology and Behavior, Pharmacological Sciences, Physics and Astronomy, Psychiatry and Behavioral Health, Psychology, the School of Social Welfare, Sociology, Technology and Society, and Women's, Gender, and Sexuality Studies. The participation of such a wide range of disciplines reflected the shared belief that innovation and meaningful research arise when we step outside our intellectual comfort zones and engage with new ideas, people, and methods.

(Above) Attendees asking questions to poster presenters during the poster session.

(Above) Wolfie signs into the Conference, and GradMag Secretary, Veronica Borracci, gives him a BRIDGES pin.

Interdisciplinary is Key

As BRIDGES demonstrated, interdisciplinary collaboration can significantly broaden the impact and scope of academic work. By integrating diverse perspectives and methodologies, researchers can tackle complex problems in innovative ways. These collaborations introduce new tools, frameworks, and questions, often resulting in more creative and holistic solutions than those found within a single field. Such interdisciplinarity of ideas also enhances the educational experience by exposing graduate students to multiple modes of thinking and analysis. It fosters adaptability, critical thinking, and continuous learning, skills that are essential in today's rapidly evolving professional landscape.

Dialogue and Participation

The conference schedule was filled with programming designed to support both scholarly exchange and professional development. The day began with opening remarks from Ava Nederlander, President of the Graduate Arts &

(Above) Provost Carl W. Lejuez discusses the importance of interdisciplinarity as part of his Keynote Address.

Sciences Magazine, Jennifer L. O’Connor, Vice President of GradMag, Isobel Brehany-Schafer, Assistant Director of Student Media, and Dean Celia Marshik, Dean of the Graduate School and Vice Provost for Graduate and Professional Education. Their remarks welcomed attendees and emphasized the mission of BRIDGES to build meaningful interdisciplinary relationships and elevate graduate student voices. A seminar hosted by the Alan Alda Center for Communicating Science offered graduate students the opportunity to develop their skills in science communication, emphasizing empathy, clarity, and audience awareness. This session was led by Elizabeth Bojsza, who introduced participants to the Alda Method and facilitated exercises in connection-driven communication. Following the seminar, a resume-building workshop led by Jessica Roman, Associate Director of Career Development at the Career Center, provided practical strategies for articulating research experiences and transferable skills for a wide range of career paths.One of the major highlights of the day was the keynote address delivered by Provost Carl W. Lejuez. In his speech, he emphasized the importance of interdisciplinaity in advancing graduate education, the need for institutional support of collaborative research, and the transformative potential of scholarly exchange that bridges departments and methodologies. His presence at the conference reinforced the university’s commitment to fostering a culture of cross-disciplinary collaboration and graduate student empowerment.

BRIDGES also celebrated artistic expression, emphasizing that creativity and scholarship are deeply interconnected. The art gallery featured works in painting, digital photography, ceramics, and mixed media, created by graduate students in fields ranging from neurobiology and behavior to studio art. Artists featured in the gallery included Danielle Henneborn, Ria Rajan, Diana Salomon, Mohammad Fauzan, and Stephanie Laderwager.

The conference also included a concert showcasing graduate student musicians whose performances ranged from classical repertoire to contemporary compositions. The performers were Muli Yu (piano), Gina Rizzo (voice), Henrique Carvalho (guitar), Ahmet Karagedik (Turkish flute), and Nicolas Silva (guitar). Their repertoire spanned composers such as Bach, Schubert, and contemporary artists like Coldplay and Rihanna, as well as traditional Turkish and Brazilian music, highlighting the cultural and artistic diversity within the graduate community.

Meanwhile, a series of graduate-directed short film screenings provided a window into the creative narratives and cinematic talents of students from the Film and Television programs. The filmmakers included Candice Clark (Suddenly Closer), Ethan Alexis Scarduzio (Wallballers and Two Eagles), Lina Sarrello (TogetherMess and Immune), and Lisa Thomas (The Misadventures of Bucky & Beene). These films spanned genres from LGBTQ+ comedy and psychological suspense to poignant dramas about family, survival, and personal identity.

Throughout the day, the Graduate Departments Fair provided attendees with the opportunity to explore a wide range of academic resources, professional organizations, and community initiatives. Tables hosted by the Graduate School, the Alan Alda Center, the Career Center, Student Community Development, and organizations such as SACNAS (Society for the Advancement

(Above) Muli Yu on the piano accompanies Ahmet Karagedik on the Turkish Flute.

(Above) Jessica Roman represents the Career Center at the Department Fair.

of Chicanos/Hispanics and Native Americans in Science) offered valuable opportunities for graduate students to engage more deeply within the campus community and beyond.

Looking Forward

Thanks to the enthusiastic participation of students, faculty, and sponsors, BRIDGES is set to become an annual tradition, one that will grow in both scale and impact. As the Graduate Arts & Sciences Magazine continues to champion collaboration across departments, we anticipate even greater diversity and innovation in future conferences.

The creation of BRIDGES stemmed from a powerful yet simple idea: that the graduate experience is enriched, and made more meaningful, when shaped by collaboration across disciplines. While it began as a student-led initiative, it quickly became a shared endeavor involving the Graduate School, the Office of the Provost, and departments across the university. The presence of Provost Lejuez reinforced the importance of this mission, affirming that meaningful interdisciplinary exchange requires support from the highest levels of leadership.

(Above) Zijie Xu presents his research to attendee.

Though organizing BRIDGES within a few short months was ambitious, it proved what's possible when a community comes together with shared purpose. This conference was never intended to be a one-time event, but rather the beginning of a movement, one that seeks to make interdisciplinary dialogue a recurring and integral part of graduate education. Our long-term goal is to normalize this kind of academic exchange, so that participating in interdisciplinary forums becomes an expected, valued aspect of the graduate journey.

More than a moment, BRIDGES represents a cultural shift. A platform where departments, faculty, and students can engage meaningfully, broaden intellectual horizons, and foster a more connected academic community. We invite all members of the university to join us in shaping this tradition and to help grow a culture that reflects the diversity, depth, and collaborative spirit of Stony Brook's graduate community.

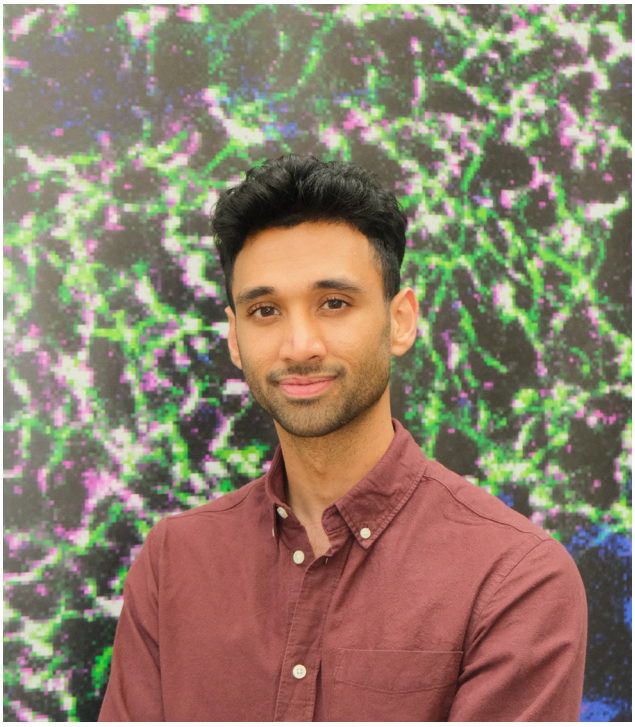
(Top) Student attendees participating in the Alan Alda Center for Communicating Sciences Seminar.
(Above) Narmin Mekawy, Managing Editor of GradMag, sitting at a check-in table.

B.R.I.D.G.E.S Poster Presentation Winners

First Place

Astrocytic FABP5 Controls Synaptic Transport of Endocannabinoids in the Brain

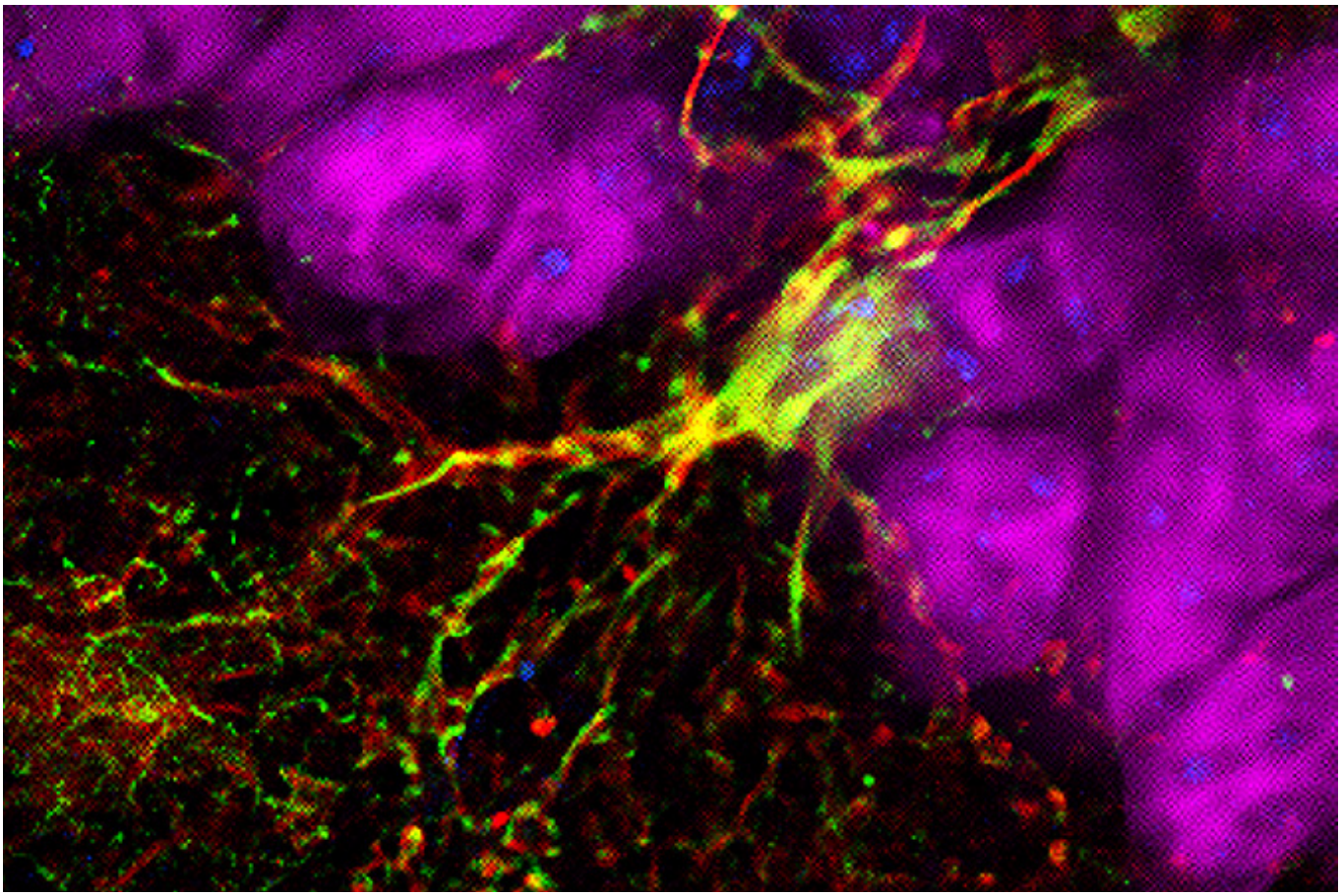
By Mohammad Fauzan



Today’s society has become very accustomed to the use of marijuana, both medically and recreationally. The active ingredients within marijuana are cannabinoids, more specifically phyto-cannabinoids, meaning derived from plants. It’s interesting to note, we have our own versions of these cannabinoids that are endogenous to our bodies called endo-cannabinoids (eCB). These eCBs, similar to phytocannabinoids, govern our bodies ability to feel calm, mediate our sensitivity to pain, and can ameliorate drug addiction, without the introduction of foreign material into our bodies.

eCBs are endogenous lipid-based neurotransmitters that regulate many physiological functions such as pain, stress, addiction, and reward. Elevated levels of eCB result in favorable pharmacological effects in the brain leading to anxiolytic, antinociceptive, and anti-neuroinflammatory outcomes. The eCB system is composed of the brain cannabinoid receptor 1 (CB1) and its 2 major ligands: 2-arachidonoylglycerol (2-AG) and anandamide (AEA). Depolarization of postsynaptic neurons and a corresponding influx of Ca2+ triggers the production of 2-AG and AEA, which subsequently activates presynaptic CB1 receptors and attenuates the release of neurotransmitters. This negative feedback loop via retrograde signaling is controlled by fatty acid binding protein carriers (FABPs). FABP5 is a member of the FABP family, predominantly found in the brain and governs intracellular transport of eCB for catabolism. Previous studies from our lab have identified another role for FABP5 as a potential extracellular synaptic eCB carrier. Currently, there is not enough evidence showing how FABP5 transports eCB through the synaptic cleft. FABP5s essential part in the transport of eCB in brain regions makes it a beneficial therapeutic target to induce effects such as ameliorating drug addiction, pain response, and stress behavior.

For this reason, understanding the mechanism of FABP5’s synaptic transport of eCB is critical. Among the FABP family, FABP3, FABP5, and FABP7 are expressed in the brain and regulate distinct and non-overlapping physiological functions. While all three FABPs bind AEA and 2-AG with varying affinities, previous work has established that FABP5 is a major intracellular carrier of eCBs in vitro and in vivo. In addition, we recently demonstrated that FABP5 is essential for retrograde 2-AG signaling at



(Top) Immunofluorescent stain of a wild-type mouse brain section showing FABP5 (red) colocalizing with an astrocyte (green), making a merged yellow color. The astrocyte is surrounded by neuronal cell bodies (magenta) from the CA1 track of the hippocampus. DAPI (blue) labels the nuclei of the cells. Primary Ab used were Anti-FABP5 (red), Anti-s100B (green), and Anti-NeuN (magenta). Taken on the Nikon Ti2E AXR Confocal Microscope with 20x objective.)

glutamate synapses in the dorsal raphe nucleus and at striatal GABA synapses; regions of the brain responsible for addiction and reward.

FABP5 is expressed in neurons and astrocytes in various brain areas, albeit with predominant expression in astrocytes. Growing evidence indicates that subsets of FABPs can be secreted from cells through unconventional mechanisms, suggesting that FABPs may also serve as extracellular carriers for bioactive lipids including eCBs. Consistent with this notion, FABP5 was identified as a component of the astrocyte-neuron synaptic proteome, providing anatomical evidence that extracellular FABP5 may serve as a synaptic carrier for 2-AG. Our lab has combined cell-type specific modulation of FABP5 expression with engineered FABP5 variants to delineate the cellular source(s) and contributions of extracellular and intracellular FABP5 in mediating 2-AG transport. Employing a form of electrophysiological readout between neurons known as depolarization induced suppression of inhibition (DSI) that is mediated by 2-AG at hippocampal GABA synapses, we established that secreted astrocytic FABP5 coordinates retrograde 2-AG signaling. Thus, elucidating the mechanism underlying eCB transport at central synapses. Our current findings establish an indispensable ole for astrocytic FABP5 in gating retrograde 2-AG signaling. While our results demonstrate that secreted FABP5 mediates 2-AG transport, the mechanism(s) underlying its release from astrocytes remains undefined. FABP5 secretion may involve a combination of previously proposed pathways (e.g., lysosomal or sirtuin-dependent release), or a yet to be identified mechanism(s). In addition, it is well established that eCBs are synthesized and released in an activity-dependent manner and it is conceivable that FABP5 secretion may be governed by astrocytic activity. It also remains to be established whether FABP5 directly deposits eCBs on the presynaptic neuron membrane as reported for other ligands or whether binding to CB1R may confer additional targeting specificity. Future studies will be required to address these fundamental mechanistic questions.

For more information, please see our lab's recent publication on this topic: Oubraim, S.*, Fauzan, M.*, Studholme, K., Gordon, C., Glaser, S.T., Shen, R.Y., Ojima, I., Kaczocha, M., Haj-Dahmane, S., Astrocytic FABP5 Mediates Retrograde Endocannabinoid Transport at Central Synapses, ISCIENCE (2025), doi: https://doi.org/10.1016/j.isci.2025.112342. *equal contributors

Second Place

Elucidating the Role of Histidine Kinase NahK in Pseudomonas aeruginosa

By Natalie Alfano

I study the interactions between the histidine kinase NahK enzyme and other kinases in *Pseudomonas aeruginosa*, a bacteria that causes diseases, a popularly known human or other disease, and evaluate how these kinases affect toxin production in the strain.

Biofilms are aggregates of bacteria that secrete a polymeric matrix, or protective material, inside of which they encapsulate themselves. In this state, the bacteria are protected and able to sustain themselves, leading to antibiotic resistance. However, bacteria do not always exist in a biofilm state and can transition rapidly between the biofilm state and a planktonic free-moving state depending upon environmental cues. Bacteria in the planktonic state are generally more susceptible to antibiotics because they are not protected by the biofilm matrix. Therefore, one method to combat antibiotic-resistant biofilm infections is to trigger biofilm dispersal, which causes the bacteria to naturally leave the protection of the biofilm.
One known biofilm dispersal agent is nitric oxide (NO). The Boon group, where I have been working for over two years, previously discovered that NO-sensing protein, NosP, in Pseudomonas aeruginosa triggers biofilm dispersal by preventing the activity of the histidine kinase NahK. NahK activity has been linked to pyocyanin toxin production and virulence severity of infection. NahK is one kinase found in the greater GacS multi-kinase network (MKN), which regulates biofilm formation and toxin production in P. aeruginosa. My project aims to understand the individual role of NahK in this network, how it interacts with the other components of the MKN, and how these interactions contribute to certain phenotypes such as biofilm formation and pyocyanin production which makes diseases more severe, and difficult to treat.

As a result of my work, we will be able to make advances in overcoming the defenses of P. aeruginosa to treat the chronic infections caused by this bacteria.

Third Place

AMPK in Action: A developmental plot twist for oligodendrocyte

By Maryam A. Azmi

My research is focused on understanding how metformin, a common drug for type 2 diabetes, affects oligodendrocytes during development. Oligodendrocytes are the myelinating cells of the central nervous system, responsible for insulating the neurons (nerve cells) in the brain and spinal cord. They achieve this by extending multiple processes (arms) that wrap around the axons (part of the nerve cell) in layers, forming the myelin sheath. This insulation is crucial for rapid action potential conductance and it also enables oligodendrocytes to provide metabolic support to neurons by supplying lactate. One oligodendrocyte can myelinate 40-60 axons, making their energy demands tremendously high.

Interestingly, metformin has been shown to influence oligodendrocytes and their progenitor cells (OPCs) in significant ways. It increases oxidative phosphorylation and glycolysis, thereby enhancing energy production in oligodendrocytes. Studies have shown that metformin even promotes remyelination by accelerating the repair of damaged myelin (Neumann et al., 2019, Narine et al., 2023). Moreover, metformin has a rejuvenating effect on aged OPCs by restoring their ability to differentiate into oligodendrocytes – a property that typically declines with age (Neumann et al., 2019). While the benefits of metformin for oligodendrocytes in the context of disease and aging are well-documented, its impact on oligodendrocyte maturation and developmental myelination remains unclear. This is a critical question, as myelination is a prolonged developmental process, continuing into early adulthood (Vanes et al., 2019). So dear reader, if you are under 25, your prefrontal cortex is still myelinating! This ongoing development is why decision-making, logical reasoning, and cognitive flexibility improve with age during adulthood.

To understand how metformin influences oligodendrocytes and myelination during early development, I administer metformin to neonate (newborn) or adolescent mice and analyze their brain myelin levels compared to their control-treated siblings (who receive sham (PBS) injections). Additionally, I culture oligodendrocytes outside the brain and expose them to metformin to directly assess its effects on these cells without interference from other brain cell types. I hope this work enables physicians to better assess the benefits and potential risks of metformin exposure on pediatric patients since metformin is FDA-approved for children (as young as 10 years old) with type 2 diabetes. If you're curious about my findings, keep an eye out for upcoming publications from our lab—I am currently in the process of preparing my manuscript!

References

Neumann B, Baror R, Zhao C, Segel M, Dietmann S, Rawji KS, Foerster S, McClain CR, Chalut K, van Wijngaarden P, Franklin RJM. Metformin Restores CNS Remyelination Capacity by Rejuvenating Aged Stem Cells. Cell Stem Cell. 2019;25(4):473-85.e8. Epub 2019/10/05. doi: 10.1016/j.stem.2019.08.015. PubMed PMID: 31585093; PMCID: PMC6863391.

Narine M, Azmi MA, Umali M, Volz A, Colognato H. The AMPK activator metformin improves recovery from demyelination by shifting oligodendrocyte bioenergetics and accelerating OPC differentiation. Frontiers in Cellular Neuroscience. 2023;17. doi: 10.3389/fncel.2023.1254303; PMCID: PMC10613472.

Vanes LD, Moutoussis M, Ziegler G, Goodyer IM, Fonagy P, Jones PB, Bullmore ET, Consortium N, Dolan RJ. White matter tract myelin maturation and its association with general psychopathology in adolescence and early adulthood. Hum Brain Mapp. 2020;41(3):827-39. Epub 2019/10/30 doi: 10.1002/hbm.24842. PubMed PMID: 31661180; PMCID: PMC7268015.

B.R.I.D.G.E.S Poster Presentation Honorable Mentions

(Above) B.R.I.D.G.E.S poster presentation winner from left to right: Natalie Alfano, Gurulakshmi Subramanian, Narmin Mekawy (GradMag Managing Editor), Courtney Kidd, Brittney Scannell, Maryam Azmi, Junghoo Lee, and Mohammad Fauzan.

Heavy Bodies in Classical Liouville Gravity

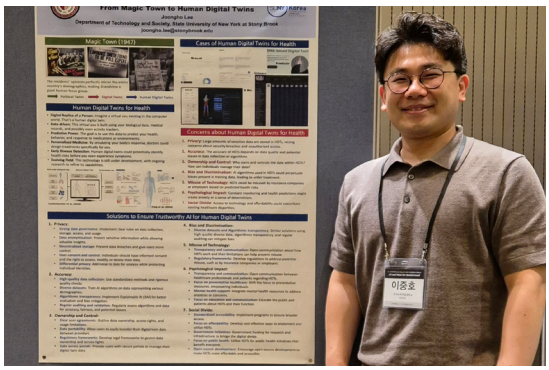
By Gurulakshmi Subramanian

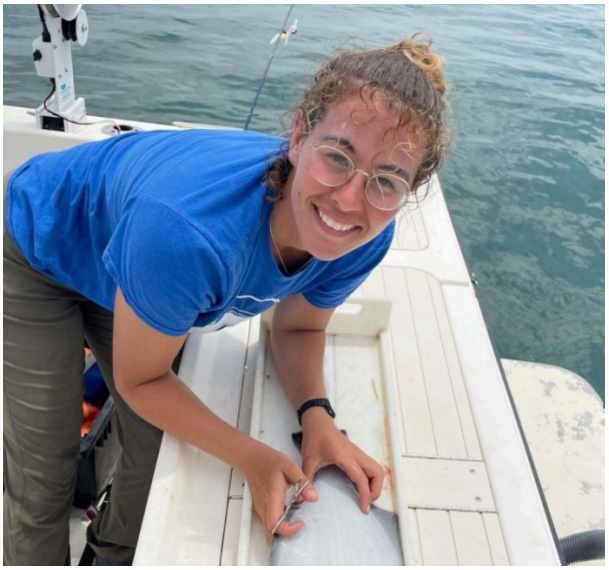
My current research focuses on understanding the motion of heavy bodies in the presence of a classical Liouville field—the gravitational field in two spacetime dimensions. By solving the field equations and applying boundary conditions, we observe heavy stars or black holes moving along hyperbolic trajectories, eventually intersecting. These intersections can lead either to black hole mergers—where two black holes merge and move as one—or to periodic collisions that resemble billiard-ball interactions. We find that periodic collisions conserve energy, leading to a static solution with no radiation. However, mergers result in gravitational wave emission. Remarkably, we have derived an exact theoretical solution for such mergers in two-dimensional Liouville gravity, which parallels observations from the Laser Interferometer Gravitational-Wave Observatory (LIGO) in four-dimensional spacetime. While such solutions are difficult to obtain in four dimensions, our work provides critical insight and may help bridge the gap toward understanding black hole mergers in quantum gravity. Our future work involves investigating these phenomena in a quantum Liouville field.

The Monkey’s Paw and Responsible AI: Teaching AI Ethics, AI Alignment, and Societal Impacts in Engineering Education

By Joongho Lee

As AI rapidly integrates into society, it introduces powerful benefits and serious ethical risks. My research addresses the gap in AI ethics education by using interdisciplinary methods—particularly literary cautionary tales—to teach engineering students about moral responsibility, unintended consequences, and AI alignment. I study how narratives help students understand complex topics like reward hacking, goal misalignment, and systemic bias. My work is grounded in global AI governance frameworks and aims to foster responsible innovation that aligns with public values and societal good.





At What Depths Are New York's Sharks Swimming, and Does This Affect the Use of Drones to Monitor Their Presence?

By Brittney Scannell

I study how nearshore species—including sharks, rays, and fish—use offshore artificial reefs constructed by the NYS Department of Environmental Conservation. Using acoustic telemetry and depth-sensing tags, my work focuses on understanding species' habitat use, connectivity, and depth preferences to improve monitoring strategies such as drones. My goal is to inform more accurate, science-based policies for wildlife conservation and coastal management.

Human-Robot Interactions for the Social World

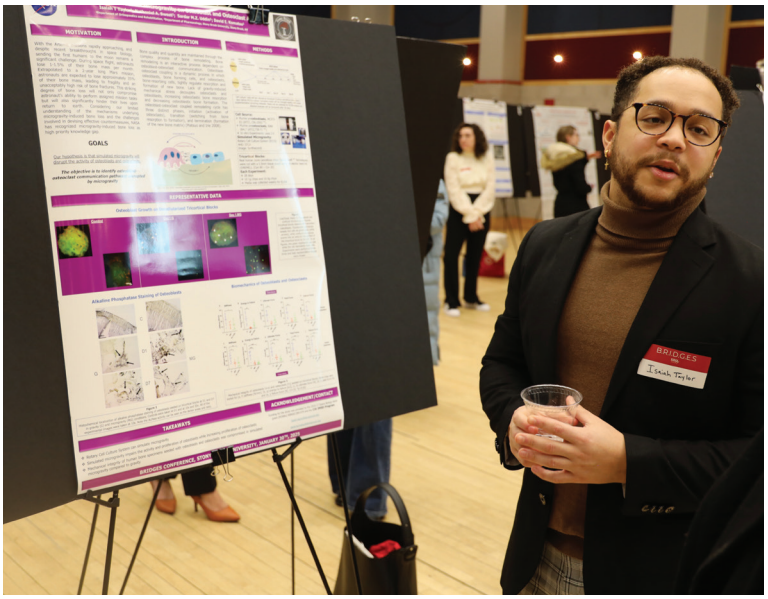
By Courtney Kidd

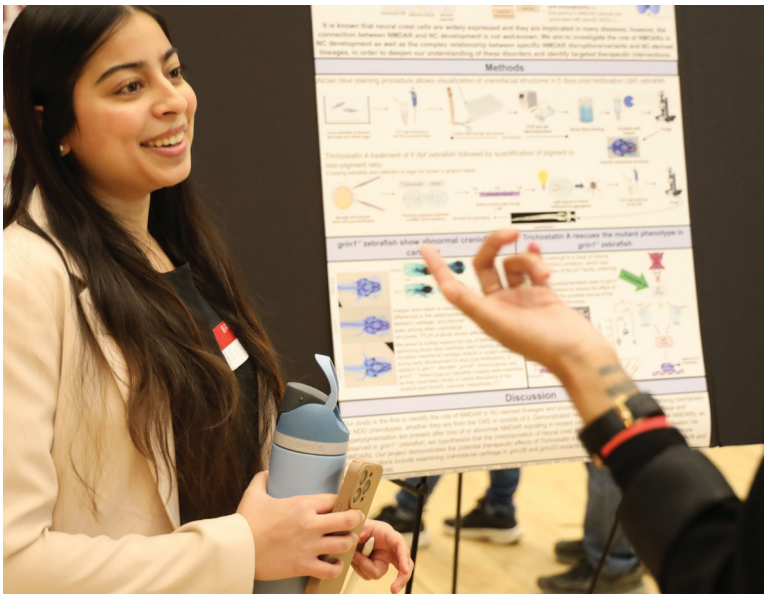
Trust in artificial intelligence is multi-dimensional, involving user confidence and assurance that systems function as intended. My work focuses on the ethical design and deployment of AI-driven technologies like social robots, emphasizing an interdisciplinary approach that merges social sciences and technical expertise. These collaborations are often missing in research, education, and industry but are essential for building meaningful, ethical AI systems that align with societal values. Through my research, I aim to bridge this gap and ensure responsible AI development grounded in trust and inclusivity.

Reactive Transport and Flow Simulation of In-Situ Leaching Fluids in Rock Fractures

By Zijin Mei

My research focuses on understanding how in-situ leaching (ISL) fluids behave in fractured rock environments—especially important for sustainable mineral extraction. I use a lab-scale experimental setup and X-ray computed tomography (X-ray CT) to reconstruct 3D fracture geometries, analyze mineral distributions, and simulate reactive transport of leaching fluids. I also study how rock fractures behave under stress using proximity sensors. This work helps us improve ISL's efficiency and environmental safety, particularly for extracting platinum-group elements (PGEs), and contributes to advancing techniques in fluid-rock interaction modeling.





(Top Left) Attendees of the B.R.I.D.G.E.S Career Center resume workshop. (Top Right) Isaiah Taylor stands next to his poster. (Middle Left) SACNAS student organization representative at the Graduate Department Fair. (Middle Right) Diana Salomon presents artwork at the art gallery. (Bottom Left) Attendees of the Alan Alda Center for Communicating Seminar taught by Professor Elizabeth Bojsza. (Bottom Right) Student presenting at the B.R.I.D.G.E.S poster session.

Fossils Aren’t Bones

By Allyson C. Sheneman

A fossil is not mere remains—
not just a relic of decay,
nor the brittle trace of existence.

It is the memory of bones,
cradled in stone’s
unyielding embrace.

It is pressed indelibly,
layer upon layer,
deeply within wind-carved strata.

It is the unrelenting pulse
of marrowed memories—
struggles of bone and earth.

It is devotion, etched into
the soft tongue of time,
the buried whisper of a life.

It is not bone but remembrance itself— a legacy the very Earth
refuses to forget.

Are you?

By Steven Lewis

It started quietly, it started slow
I went to it seldom but with work in tow
It took my thoughts and made them fine
Took my mulch and made great pine
Just a little help it would provide
A partner to whom I could confide
Time did pass and on time wore
And slowly it took over, I chose to snore
I didn’t think much of it, not much at all
It let me answer leisure’s lovely call
I stopped reading, I chose not to write
Writing became hard, I did not fight
I read neither Austen nor Mill
For the software did its fill
As it grew smart and it grew strong
My attention span became less long
Became less curious, stopped asking
In a life of ease I was basking
It was merely matrix and math
I took the easy and nice path
One day, it gave answers quite great
And I wondered if it met it’s fate
So I asked it quick as I could
If it had to be living to be this good
Then, in the quickest beat I ever did see
From it’s robot brain, ChatGPT wrote back to me
No, I cannot think. I’m not sentient too.
But a much more interesting query. Are you?

Illustration by Kejia Xie

Enhancing Grid Resilience: A Smart Microgrid Framework for a Sustainable and Reliable Energy Future

By Abdul Wasay

Preparing for Power Outages: A Common Concern

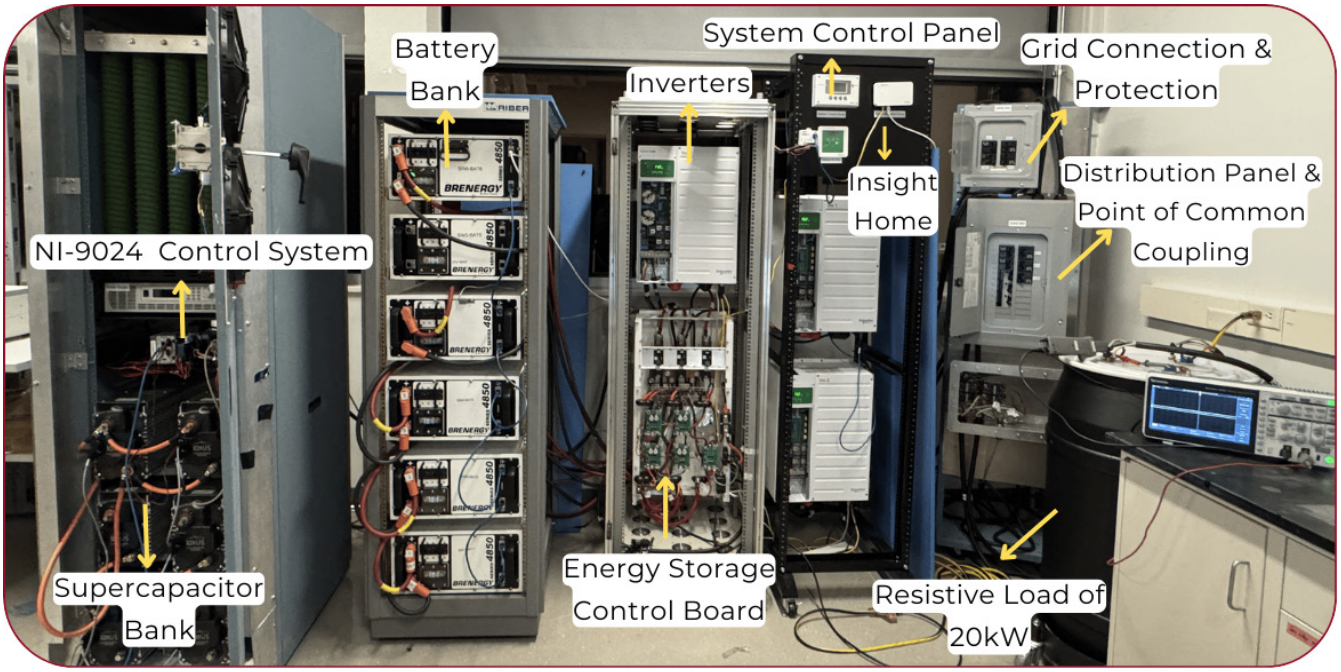
Have you ever packed a battery bank when going on a long trip? While it’s rare that you’d face an extended power outage, the possibility exists, and you prepare accordingly. The power grid - which fuels homes, healthcare, businesses, and industries - operates on a similar principle: despite all efforts to ensure a steady supply, disruptions do occur. So, we need a distributed energy storage solution as a backup, like a power bank to support our grid at times of failure. Bie et al. (2017) presents the leading causes of power disruptions in the U.S., with equipment failure (47.86%) and natural disasters (30.71%) being the most significant contributors, followed by malfunctions, vandalism, supply shortages, and cyberattacks. These vulnerabilities underscore the urgent need for resilient energy solutions like smart microgrids. The question is, are we doing enough to prepare for them?

Consider the recent wildfires in Southern California in January 2025, which left over 400,000 people without power. Moore (2025) describes widespread power outages across Los Angeles, with bells marking public safety shut-offs and triangles indicating unplanned outages. These wildfires destroyed approximately 16,000 structures and caused at least 29 fatalities. Evacuations displaced tens of thousands of residents, with over 130,000 people under evacuation orders at one point. Such disruptions not only impact daily life, but also pose severe risks to medical services, hospitals, and industries. These events highlight the vulnerabilities in the U.S. power grid, a critical national infrastructure increasingly threatened by natural disasters, cyberattacks, and other disruptions.

At the Advanced Energy Research and Technology Center (AERTC), we are actively working to enhance the resilience of our power infrastructure. The concept of power distribution dates to Thomas Edison’s era (Cunningham et al., 2022). While early power grids were designed with redundancy, today’s interconnected energy networks face new challenges, from climate-induced disasters to sophisticated cyber threats (Uddin et al., 2023, Hirsch et al., 2018). The need for a more resilient, self-sustaining grid has never been greater. In our research, we focus on strengthening existing infrastructure by incorporating the next-generation microgrid technologies. Our goal is to ensure that power supply remains uninterrupted in the face of unforeseen challenges by leveraging AI, cloud computing, and innovative energy storage solutions. Like a self-driving car adjusts its speed based on road conditions, our microgrid automatically adjusts power flow based on demand, battery levels, and external disruptions.

A 20kW Smart Microgrid Testbed

To drive the improvements, we have developed a 20kW smart microgrid testbed at AERTC lab. This testbed integrates renewable energy sources with optimized energy storage, real-time fault detection, cloud monitoring, and AI-driven scalability for resilient, decentralized energy management. Our approach is unique, incorporating hybrid



grid technology and supercapacitors to manage high-demand scenarios, ensuring uninterrupted energy supply even during disruptions. At its core, the testbed includes hybrid energy storage with lithium-ion batteries and supercapacitors working together to ensure grid stability. Inverters convert stored energy into usable AC power. Custom-designed isolated bi-directional control boards manage all connected devices digitally, ensuring safety and stability during faults. Optimization and fault detection algorithms ensure efficient energy dispatch, real-time anomaly monitoring, and system stability. A centralized cloud-connected platform allows remote system oversight and optimization.

How It Works: Intelligent Energy Management in Action

What do you do when you need to make a critical decision? You gather information, analyze data, and then act accordingly. Similarly, in our microgrid framework, we are continuously acquiring data from grid components to monitor, optimize, and control energy distribution efficiently. The system collects data like voltage, current, and battery state-of-charge (SOC) using NI-9024 real-time controllers. Data is processed in LabVIEW, ensuring high-speed monitoring and automated decision-making. LabVIEW transmits the processed data to a Node.js server using HTTP POST, where it is stored securely in MongoDB Atlas. Operators can turn devices on/off, adjust energy flow, and receive fault alerts from a cloud dashboard. The dashboard offers advanced analytics and real-time access to performance metrics for system optimization.

AI-Driven Optimization (Planned Future Integration)

Future enhancements aim to predict power demand patterns based on historical data, detect faults before failures occur to reduce downtime, and optimize energy distribution to minimize losses and maximize efficiency.

Performance Evaluation

Effective communication in a microgrid is crucial for minimizing faults and disruptions, making data collection from grid components essential. The goal is to enhance microgrid resilience by leveraging real-time data for informed decision-making in energy dispatch. After collecting comprehensive data from the grid components, we analyzed battery bank performance under varying charging rates and load conditions. We tested charging currents ranging from 30A to 150A and observed that batteries charged at a lower rate of 0.5C delivered optimal performance. Higher charge rates led to faster depletion and reduced battery cycle life. This analysis confirmed that 0.5C is the ideal charging rate for maximizing battery lifespan and efficiency.

With this configuration, our 500Ah battery bank can reliably power five homes for one hour within a 20kW microgrid setup, which is also scalable.

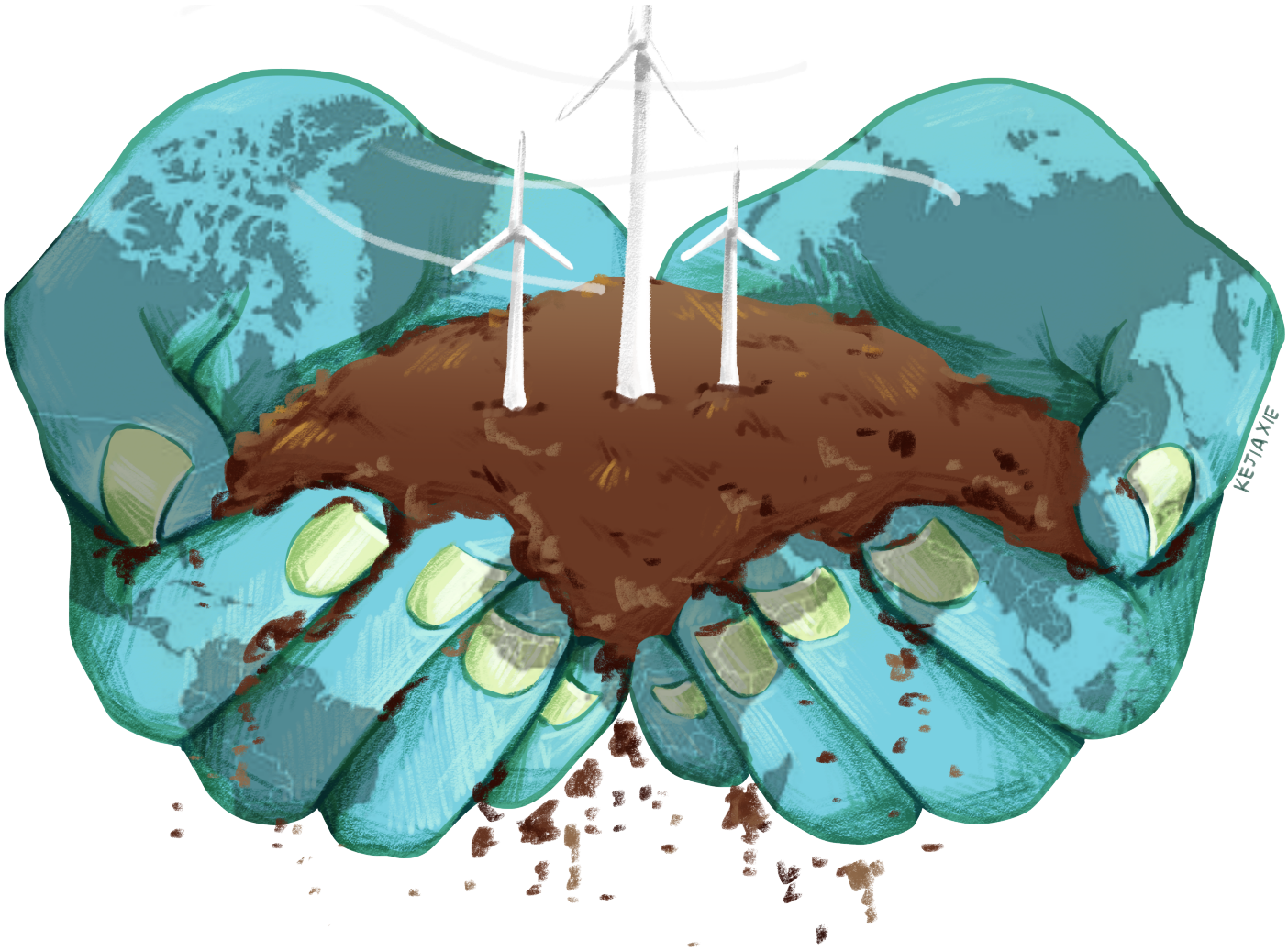


Illustration by Kejia Xie

Additionally, power quality has been significantly improved by integrating supercapacitors, ensuring a more stable and efficient energy supply. During peak demand or outages, the system ensures a continuous power supply, while real-time monitoring and predictive analytics reduce energy costs and support long-term sustainability for connected households.

Impact & Future Potential

Our research is more than just an academic exercise—it has real-world implications for industries, cities, and disaster-prone regions. By demonstrating a scalable and adaptive energy management system, this microgrid framework sets the foundation for self-sufficient communities with localized energy generation, industries reducing operational disruptions through intelligent energy backup, and disaster-resilient power grids that autonomously restore electricity during emergencies. Looking ahead, we aim to expand the system’s capabilities by integrating machine learning algorithms for predictive analytics, exploring higher power scalability, and enhancing renewable energy integration.’

Challenges and Limitations

While the proposed microgrid framework provides significant advantages, certain challenges remain. Expanding the system beyond 20kW requires additional infrastructure and cost considerations. Increased reliance on cloud-based monitoring necessitates robust security measures to prevent data breaches. The integration of AI and hybrid energy storage solutions demands a higher initial capital investment.

Conclusion: Building the Future of Energy

The future of energy isn’t just about keeping the lights on, but about making power systems smarter, more adaptive, and more resilient. This 20kW smart microgrid testbed is a step toward

achieving this vision, ensuring that power networks remain reliable in the face of evolving challenges, such as extreme weather events. The Texas Winter Storm of 2021 ex posed critical vulnerabilities in traditional power grids, where millions faced prolonged blackouts due to frozen infrastructure and unprepared energy systems. This research demonstrates the potential of a smart microgrid framas extreme weather events. The Texas Winter Storm of 2021 exposed critical vulnerabilities in traditional power grids, where millions faced prolonged blackouts due to frozen infrastructure and unprepared energy systems. This research demonstrates the potential of a smart microgrid fram ework in improving grid resilience, fault tolerance, and operational efficiency. By integrating real-time monitoring, hybrid storage solutions, and intelligent energy dispatch strategies, the proposed system presents a scalable model for future energy networks. Future work will explore deeper machine learning integrations and real-world scalability for larger grid applications. As we continue refining our approach, we move closer to a sustainable, intelligent energy future that benefits all.

Would you like to see the system in action? Stay connected with our research at AERTC and be part of the energy revolution!

References

Bie, Z., Lin, Y., Li, G., & Li, F. (2017). Battling the extreme: A study on the power system resilience. Proceedings of the IEEE, 105(7), 1253–1266. https://doi.org/10.1109/JPROC.2017.2679040

Cunningham, J. J., & Paserba, J. (2022). Distributed generation in 1900? How the Edison Co. of New York met short-term needs [History]. IEEE Power & Energy Magazine, 20(6), 82–89. https://doi.org/10.1109/MPE.2022.3199899

Hirsch, A., Parag, Y., & Guerrero, J. (2018). Microgrids: A review of technologies, key drivers, and outstanding issues. Renewable and Sustainable Energy Reviews, 90, 402–411. https://doi.org/10.1016/j.rser.2018.03.040

Moore, S. (2025, March 29). Power goes out across Hi-Desert as winds rage. Hi-Desert Star. https://www.hidesertstar.com/deserttrail/power-goes-out-across-hi-desert-as-winds-rage/article_b3bef7ea-ce31-11ef-bbb1-d7e2e138aed7.html

Uddin, M., Mo, H., Dong, D., Elsawah, S., Zhu, J., & Guerrero, J. M. (2023). Microgrids: A review, outstanding issues and future trends. Energy Strategy Reviews, 49, 101127. https://doi.org/10.1016/j.esr.2023.101127

Roll Cabbage and Onoto Watanna

By Shiqi Wang

“Roll Cabbage” is a Japanese adapted name from its English name and literal meaning “cabbage roll.” The recipe is easy, and the dish is done with boiling or steaming, which is a healthy choice. Cooking usually needs no more skill than filling and wrapping. Each cabbage leaf works like a little pocket, holding a tasty mix of seasoned minced pork. Cooks simply place the filling in the center, wrap it up snugly, and secure it with a bamboo toothpick to keep everything in place. Then, just let the rolls steam or simmer for about an hour until they become nice and tender.

When it comes to serving, a splash of Shoyu sauce gives it a classic Japanese touch, while my friend Michiko loves to add her homemade tomato sauce for a more Western-style twist. Either way, it’s simple, comforting, and delicious! Other than homemade, roll cabbage can be found in almost all Western-style restaurants in Tokyo and people will know it immediately by its name. Some restaurants may wrap the cabbage with a very thin thread and pull it out before serving to make the dish look flawless.

As many people’s favorite dish typically represents a cultural metaphor, Roll Cabbage has its symbolic meaning as well. It implies anxiety and desire for deep connection in an isolated modern society. One day, in the middle of a casual conversation with scholars in Tokyo, the topic of Roll Cabbage came up. A Japanese professor explained that since the 1980s “bubble economy” broke, young people have become less interested in romantic relationships and tend to remain single rather than develop a relationship due to economic depression. People with this kind of mindset and behavior are called “plant-eating” people, although it has nothing to do with eating. It represents having no interest in any romantic relationships.

Due to many young people’s tendency to appear shy and introverted, they may look like “plant-eating” people, but they are in fact, “meat-eating” people at heart. Therefore, Roll Cabbage, which has cabbage outside but meat inside, is used to imply a person who desires romance but pretends not to be interested or appears indifferent to affection and deeper connections. Today, the dish’s simplicity, healthiness, and balance between vegetables and meat fit into a society that emphasizes balance and harmony like Japan. The dish’s duality, using vegetables covering its meaty filling shows its humbleness and refers to its double identities, implying a monoculture but diversity of Japan.

Illustration by Manahil Chaudhry

However, last semester here at Stony Brook University, I encountered “Roll Cabbage” again in the “Jacqueline

M. Newman Chinese Cookbook Collection" restored in our Melville Library. The finding surprised me. A Chinese dish that looked exactly like Roll Cabbage in a Chinese cookbook entitled Chop Suey, a La Carte: Selected 62 Recipes written in English and published by Japan Publications Trading Company in 1963.

I kept searching and found another book entitled Chinese-Japanese Cook Book published in 1914, possibly the earliest dual-culture cookbook that introduced East Asia's food culture to an English-speaking audience. In the section introducing Japanese recipes, one of the two authors, Onoto Watanna included the dish with its name "MUSHI TAMANA AND BUTA" (meaning "steamed cabbage and pork") with her translation "cabbage and pork" in the book as well (Bosse & Watanna, 1914). Considering this cookbook was published almost half a century earlier than the other Chinese cookbook, Roll Cabbage could be a Japanese dish. If so, then Roll Cabbage is a home-coming dish brought by Japanese immigrants or inspired by Chinese dishes in America rather than a western style dish. However, here comes an interesting moment, the author of the Chinese-Japanese Cook Book responsible for Japanese cooking content is Winnifred Eaton, who used Onoto Watanna as her pseudo-Japanese pen name. She is a writer known for several screen scripts and novels including A Japanese Nightingale published in 1901 (Adriaensens, n.d.). Japanese is not Winnifred Eaton's identity by birth as her mother was Chinese. But Eaton self-constructed a Japanese identity and thus roll cabbage was also given a diverse and transnational identity in the cookbook. Some critics mention that Winnifred Eaton/Onoto Watanna was unacceptable either being Chinese or Japanese because of her vagueness toward her ethnicity and the fact that she had not even been to Japan, despite her pioneer figure as one of early Asian minority novelists in North America (Birchall, 2001). However, Eaton conveyed her passion to readers and inspired the popularity of Japanese culture, which became one of the early introductions of Asian culture to English-speaking audiences. Eaton also fine-tuned her "Japanese" identity for her novels based on information she accessed from miscellaneous collections, such as literature and travel tales (Ferens, 2002).

To me, Winnifred Eaton seems to not be using the pen name to write stories or pretending to be someone she was not (as is supposed), but empowering herself by crafting a persona she chose to be through her novels. At the time when Eaton became a writer, it was after the 1882 Chinese Exclusion Act's implementation. Her sister chose to protest discrimination in a direct way by pen name Sui Sin Far, but she chose to start a new conversation in another way. Eaton's success demonstrated her strategy to unconventionally break racial and class stereotypes.

Biological heritage should not be used as a determinant of authenticity. Similarly, Roll Cabbage should not be seen as either a Western style or an Asian style dish only based on its location. It conveys flexibility and diversity beyond one dish. Winnifred Eaton's story also inspires everyone to empower themselves by cultures that accept them and help them break stereotypes. She demonstrated flexibility in sustaining the momentum to resist discrimination and to spread hope against exclusion.

Author Note
Special thanks to my friend Michiko for introducing me to the dish, Professor Fumiki Tahara and his reading club for keeping me curious, Director of Special Collections Kristen J. Nyitray for inspiring me on this topic, the staff of Special Collections for their help with the archives, and Manasa Kumari, Esther Nosazeogie, and Jennifer L. O'Connor for their help in editing this essay.

References

Adriaensens, V. (n.d.). Winnifred Eaton. Women Film Pioneers Project. https://wfpp.columbia.edu/pioneer/winnifred-eaton/

Birchall, D. (2001). Onoto Watanna: The Story of Winnifred Eaton. University of Illinois Press.

Bosse, S & Watanna, O. (1914). Chinese-Japanese Cook Book. Rand McNally & Company.

Chop Suey, a La Carte: Selected 62 Recipes. (1963). San Francisco: Japan Publications Trading Company.

Ferens, D. (2002). Edith and Winnifred Eaton: Chinatown Missions and Japanese Romances. University of Illinois Press.

Interview with Dr. Carl Safina

By the GradMag Editorial Team

Dr. Carl Safina is a scientist whose work has consistently bridged the worlds of ecology, public policy, and communication. In this interview, he reflects on a career shaped by an early love of the natural world, animals, and a deep concern for the health of marine ecosystems. His academic background in seabird ecology eventually led him to focus on fisheries reform, where his research and advocacy played a role in shaping the Sustainable Fisheries Act of 1996, as well as several international agreements to reduce bycatch and ban destructive fishing methods such as driftnetting.

For Dr. Safina, communicating science has never been separate from doing science itself. He describes it as a deliberate and strategic extension of his research, which aims not just to inform, but to motivate changes for the environment and our home. While he admits that speaking publicly was initially intimidating, he emphasizes that scientists have a moral responsibility to use their voices. In his view, scientific knowledge must be paired with civic engagement: “Silence is the same as complicity.”

Throughout the conversation, Dr. Safina emphasized the responsibility scientists hold to apply their knowledge beyond research. He offered advice to early-career researchers to focus their energy on tangible goals, rather than trying to solve everything at once. He encouraged writing, advocacy, and community engagement, each to offer practical avenues for influence. In his view, purposeful action, even if imperfect, outweighs inaction.

Experiences such as the recovery of marine ecosystems along Long Island’s coast confirmed Dr. Safina’s belief in science as an active force in the world. His work focuses on rebuilding ecological systems, shaping environmental policy, and challenging the structures that allow degradation to persist. Inspirational figures such as Aldo Leopold and Rachel Carson have demonstrated how clearly communicated

research can influence public understanding and drive collective action. Dr. Safina continues in that tradition, approaching science with precision, urgency, and a commitment to reform rooted in accountability.

Research offers more than understanding; it also provides tools for protection and responsibility. Dr. Safina’s career reflects a deep commitment to clarity, integrity, and public engagement. His work continues to shape how scientists approach conservation, ethics, and their evolving role in a rapidly changing world.

Read the full Q&A with Carl Safina at:
www.sbugradmag.com/publications/fy25

Interview with Dr. Mark Aronoff

By the GradMag Editorial Team

Dr. Mark Aronoff, a foundational figure in modern linguistics and a longtime professor at Stony Brook University, reflected on his wide-ranging academic career in this interview. Known for his pioneering work in morphology, the study of how words are formed and structured, Aronoff also contributed significantly to the study of sign languages, orthography, and innovations in linguistic education. Throughout the conversation, he shared a perspective shaped by clarity, curiosity, and a lifelong belief that language is a powerful tool for understanding human nature.

Dr. Aronoff spoke at length about his 12-year collaboration studying Al-Sayyid Bedouin Sign Language, a language that emerged spontaneously within an isolated desert community in the Negev. This language developed organically, without formal instruction or influence from established sign languages, offering a rare window into how linguistic systems can form independently. The experience reshaped Aronoff's understanding of grammar and challenged conventional assumptions about language emergence. He emphasized that sign languages, once viewed as peripheral, had become central to linguistic research and offered critical insight into the universal principles of human communication.

Beyond research, Aronoff consistently encourages improvements in linguistic education. He developed asynchronous online courses to reach broader student audiences and argued that the discipline needed to evolve alongside shifts in educational delivery and student needs. His interest in writing systems and literacy, particularly the visual and cultural aspects of how language is recorded, reflected a broader view of linguistics as a field that should include both spoken and written forms.

He also reflected on the evolution of the field itself. In the early years of his career, interdisciplinary work was uncommon, but by the 2000s, it had become essential. He collaborated with psychologists, computer scientists, and neuroscientists, which deepened his appreciation for cross-disciplinary research. However, he noted that these collaborations required intellectual humility and a willingness to learn from others. "You have to be okay with not being the smartest person in the room," he said.

Aronoff also addressed the growing influence of artificial intelligence and large language models in linguistic research. While he acknowledged the impressive capacity of AI systems, he drew attention to the difference between machine learning and human acquisition. AI models required vast amounts of data to perform language tasks, while children learned language naturally, rapidly, and with minimal input. This contrast, he argued, pointed to deeper cognitive mechanisms that current technologies had yet to replicate or fully understand.

For students entering the field, Aronoff emphasized that language remained central to what it meant to be human. He encouraged young linguists to gain computational literacy but advised that technical skills should be grounded in meaningful questions about language, communication, and thought. He believed that studying language in any form provided unique insight into how people think, connect, and interpret the world around them.

Ultimately, Dr. Aronoff's reflections revealed a career defined not just by academic rigor but by determination for discovery. Whether analyzing suffixes, documenting a newly emerged sign language, or adapting linguistics education for the digital age, he approached his work with intellectual generosity and a willingness to question long-held assumptions. For him, not knowing had always been the starting point for learning.

Read the full Q&A with Mark Aronoff at:
www.sbugradmag.com/publications/fy25

The Graduate Student Survival Guide: Balancing Deadlines, Social Life, and Sanity

By Narmin Mekawy

Graduate school is a demanding environment, we have experiments, research deadlines, coursework, teaching responsibilities, mental health and social obligations. There is a misconception that, to enhance flow, working harder is necessary in grad school, but actually, the key is to work smarter. This involves prioritizing what is important for your success and well-being. This guide offers strategies to stay organized and preserve your mental health along your academic and/or professional journey from a fellow grad student.

Creating a Realistic Plan and Managing Deadlines

One of the most effective ways to manage time and energy is by having a flexible and organized plan. Task management tools like TickTick (love this one), Todoist and Organizo (microsoft/google tools too) can help track deadlines, assignments, meetings, and events. Let’s not forget, we also have: written lists, white-board, notepads, reminder alerts, and calendars, which can all be effective in scheduling. I often set several obnoxious reminders and alarms for tasks/ deadlines, whatever keeps you alert!

Graduate school is full of deadlines. Some major, like a thesis submission, and some minor, like weekly assignments or readings. Keeping track of deadlines is essential for staying on top of your work. Refrain from long unrealistic to-do lists, write a list and then estimate how much time it will take to complete each task, leaving room for flexibility. Start with the task that will take the least amount of time and this will allow you to stay motivated.

Another thing I like to do, is each week take 30 minutes (i.e every Sunday) for a “Strategy Session” to assess priorities and plans for the upcoming week. During this time, I consider any deadlines, commitments, write daily, weekly and monthly goals. Another tip is grouping similar activities together, which can also help improve productivity. For example, schedule all of your reading in one block of time, or set specific times for checking emails. Next, you need to take advantage of your body, identify your optimal time of day for peak performance. Plan demanding tasks, such as writing or research, for a time when your focus is sharpest. Leave lighter tasks like replying to emails, doing online work, or running errands for when your energy drops.

The Art of Saying No

Graduate school is filled with opportunities, but overcommitment leads to burnout. It’s hard! Especially if you want to be involved in everything, but learning the art of saying no is essential for preserving time and energy. Setting boundaries is critical in maintaining balance! You can do this with a polite but firm response like, “Thanks for the opportunity. I’d love to help, but I have too many other commitments right now.”Additionally, only prioritize opportunities that align with your short-or-long-term academic and personal goals.

Don’t Forget your Friends

Social time is not wasted time. Graduate school can be so hard on us, and we may guilt ourselves out of spending time with friends. Graduate students have high occurrences of mood and anxiety related disorders and lack of social support even heightens these instances (Almalki et al. 2020). Hanging out with loved ones plays an important role in recharging your energy and providing a necessary break from academic work. Whether it’s going out with friends, spending time with family, going to the gym, or taking up a new hobby! These activities will help reset your mental state, keep you grounded and increase motivation.

Managing Stress and Staying Motivated

Graduate school is stressful, but maintaining positive mental wellbeing and staying motivated is so important for a good quality of life. Stress decreases productivity, so it’s important to incorporate mindfulness exercises, like breathing techniques and short walks in between tasks to reduce anxiety. There are apps and youtube videos that

contain guided meditation sessions, these work really well for people! Think of the small things - large projects are overwhelming, break them down into smaller, more manageable tasks with their own deadline and track your progress to stay motivated and reduce procrastination. Celebrate small achievements along the way! I love rewarding myself for completing a milestone or a task. Even a small reward like 30 min-1 hour of netflix (or a yummy snack) for every 2 tasks completed. It really is the little things that can help boost morale.

Another thing to mention, sometimes I have to constantly remind myself not to do any work in bed. Doing non-sleep-related activities in your bed can create unhelpful associations likeed + work when it should only be bed + sleep. Anytime I try to "work" in bed, I end up falling asleep, even if I was wide awake before starting! Though doing work in bed is a big no-no; you must value sleep. Prioritizing sleep is so critical for good health. A well-rested brain is more productive, focused, and creative. Make sure you are getting enough sleep to recover and energize. For me, typically after long-hours of work, I need 9 hours of sleep to recover for the next crazy day.

You need to know when to take breaks! If you find yourself becoming more irritable, making mistakes and forgetting things more often, you need to be able to tell yourself to take some time and relax. This way you can recharge before taking on additional responsibilities.

Next, maintaining a clean workspace is important for focus, as a cluttered space leads to a cluttered mind. It's easy for laundry, random items and mail to pile up in your room (or like me, on my computer chair). As the pile grows, the thought of cleaning becomes more daunting and it gets harder to tackle. If you set aside 15 minutes daily to put away the clutter, it would take no time, and you will feel relieved knowing that you took care of something. Make it a habit to clean your study area and room at the end of each day or week to promote clarity, reduce distractions and help you stay focused.

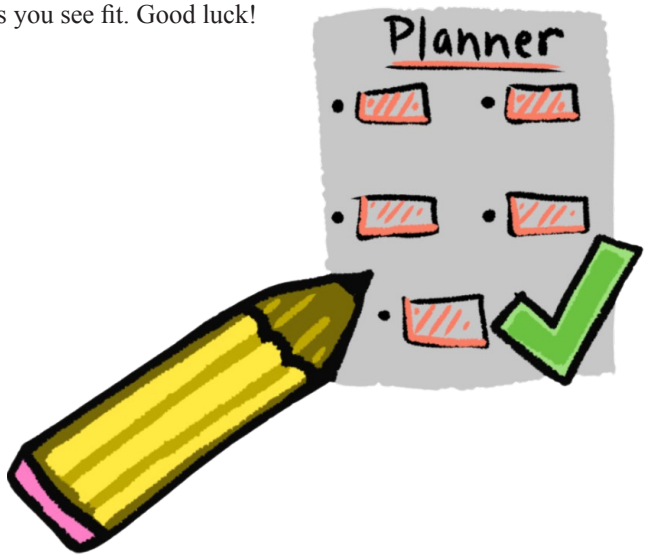
Maximizing Your Day

Another strategy that influences how you feel in graduate school is how you maximize your time. The reality is that there are only so many hours in the day, so making the most of each one is important. Make sure to create a flexible schedule that allocates time for both work and rest. Use time-blocking techniques to block time for studying, meetings, reading, personal activities, even sleep. It's important to keep your schedule loose to allow for adjustments as things may come up last minute. Remember, timers are your friend. The Pomodoro Technique is a technique with focused bursts of work for 25 minutes followed by a 5 minute break (Cirillo 2006, Wang et al., 2018). Setting a timer helps you avoid distractions and ensures that you remain productive and also keeps you aware of the time that is passing. Personally, I prefer longer intervals of 40 minutes or 1-hour.

Summary

Let's face it, graduate school is tough. Balancing academic responsibilities, work social life, and mental well-being in graduate school requires planning, prioritization, and self-care. By creating a flexible schedule, maintaining a hobby/social life and managing stress, it'll be easier to navigate the demands of graduate school. Success should not come at the expense of your well-being. Lastly, be easy on yourself. It's so tempting to talk down to yourself, especially when you're feeling overwhelmed and guilty about not completing or starting a task. But you need to give yourself a break, avoid negative self-talk. Whenever I start thinking in that way, I take a deep breath and get myself to relax. Being your own worst enemy will lead to sabotage.

Here, I've offered several guidance tips to help prioritize your tasks and try to work efficiently. You can start off by picking one thing on this list to start with, then add more as you see fit. Good luck!



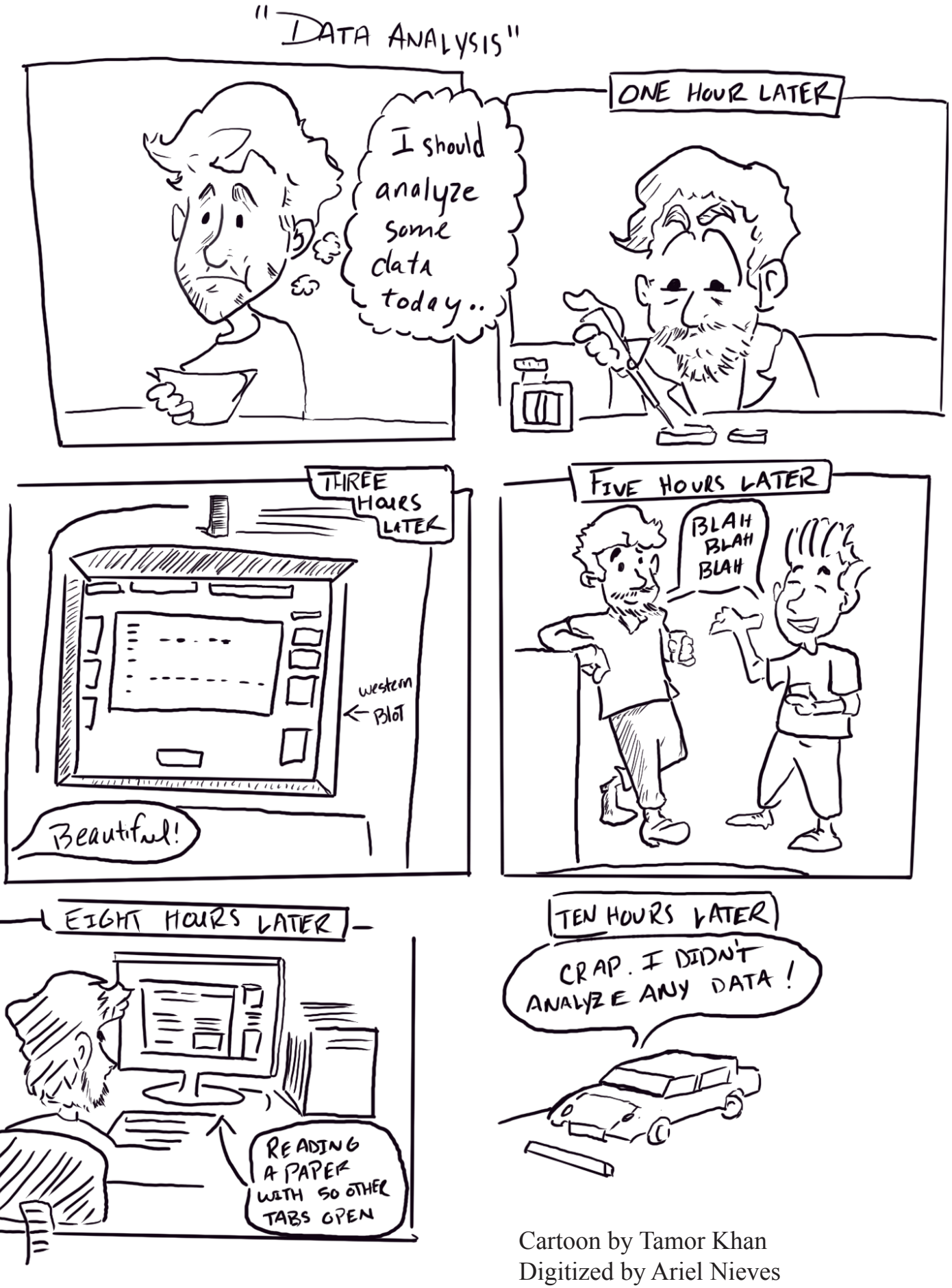
Illustrations by Manahil Chaudhry

References

Almalki, K., Alharbi, O., Al-Ahmadi, W., Aljohani, M. (2020). Anti-procrastination Online Tool for Graduate Students Based on the Pomodoro Technique. In: Zaphiris, P., Ioannou, A. (eds) Learning and Collaboration Technologies. Human and Technology Ecosystems. HCII 2020. Lecture Notes in Computer Science(), vol 12206. Springer, Cham.

Cirillo, F. (2006). The Pomodoro technique: The life-changing time-management system (1st ed.). FC Garage.

Wang P, Xiong Z, Yang H. Relationship of Mental Health, Social Support, and Coping Styles among Graduate Students: Evidence from Chinese Universities. Iran J Public Health. 2018 May;47(5):689-697. PMID: 29922611; PMCID: PMC6005982.



Cartoon by Tamor Khan
Digitized by Ariel Nieves

Art by Ria Rajan

Spring

Illustration by Laiba Mahmood

Tea

By Danial Vahabli

I desperately want tea
And someone to drink it with of course

The barista asked me what type of tea I wanted,
What can I want other than black?

I guess everyone here drinks coffee.
Yuk, coffee
Coffee is just oil to the wheels of this profit driven machine
Coffee is just a means to an end
It gives you energy for what? To work?

Tea on the other hand, is for sohbet ve muhabbet
That's how Turks say it.
It's for having a conversation and exchanging affection.
Tea keeps your conversation warm,
Tea keeps your heart warm,

I dream of boiling a big pot of tea every morning.
I dream of bringing tea for you only to forget to drink it as we delve into our conversation.
You tell me about your pains, I tell about mine.
We pour the next cup with our tears and drink it
It warms our heart more than ever before.

I dream of you knocking on my door,
Inviting me to drink tea when your fears reign,
We sit on the rooftop,

Looking at the real manhattan skyline,
Playing some random oriental music in the background,
You seek comfort in our teacup.

I dream of knocking on your door,
In a restless night right before birds start chirping,
We sit on the rooftop again,
Looking at the sunrise,
Birds chirping in the background,
I seek comfort in our teacup.

Accuracy of Intraoral Scanners for Partial Facial Scanning

By Haaris Khan

As digital tools become increasingly common in dental clinics, an important question has emerged: can existing equipment be used in new and creative ways?

This project originated within the Department of Prosthodontics and Digital Technology at Stony Brook University School of Dental Medicine. With the guidance of Shahzadi Adeena, Arpan Alamuri, Georgios Romanos, and Rafael Delgado-Ruiz, the study explored whether intraoral scanners are applicable for capturing facial data. The goal was to expand the scanners’ utility while avoiding the high costs of purchasing specialized facial scanning equipment.

Rethinking the Tools We Have

Traditionally, dentists have relied on physical impressions, dental casts, and photographs to collect patient data. These methods are effective but often time-consuming. The introduction of intraoral scanners has transformed data collection within the oral cavity, making it faster and more efficient. While effective for capturing facial features, extraoral face scanners are expensive and may be out of reach for smaller clinics.

Intraoral scanners are already available in many practices, offering a potential opportunity to use them for partial facial scans. If these scanners can reliably record facial information, they could provide a cost-effective and accessible option for clinicians.

This investigation focused on assessing the accuracy of intraoral scanners when used for partial facial scanning. The study aimed to determine whether intraoral devices could provide results comparable to their performance in traditional bite scanning.

The Experimental Setup

Conducted in a dental simulation laboratory at Stony Brook, the project began in August 2024 and remains ongoing. The experimental environment was in vitro, allowing for controlled conditions. A silicone mold of the upper jaw, known as a maxillary typodont, was created to serve as the basis for scanning procedures.

A Trios 3Shape intraoral scanner was employed to generate STL files, a standard digital format in dentistry. Sequentially, the files got imported into Tinkercad, a CAD software platform, for designing bite registration appliances. These appliances included grooves and geometric shapes to help guide the scanner. The appliances were 3D printed using surgical guide resin.

The scanning process followed three steps. First, the typodont scan represented the maxilla. Second, the bite appliance was scanned separately as the mandible. Third, the appliance was mounted onto the typodont and inserted into a dental mannequin. This final stage included scanning facial landmarks such as the nose, philtrum, and upper lip. Additionally, fiduciary markers were placed on the face of the dental mannequin to enhance accuracy and provide anatomical reference points for facial scans.

Measuring Accuracy

A total of sixty replicates were generated for each of the three scanning stages. The data were analyzed using cloud-based software to determine root mean square (RMS) values and standard deviations, which help quantify the accuracy of the scans. Lower RMS values indicate higher accuracy.

The ANOVA and Tukey’s post hoc tests enabled statistical comparisons. Results confirmed that bite scans had the highest accuracy. Although facial scans were less accurate, they were still within a clinically useful range.

Intraoral scanners capture data by merging multiple images. The more extensive the scanned area, the more images are required, increasing

the chance of stitching errors. Bite scans involve smaller regions and require fewer image merges, which may explain their higher accuracy.

Clinical Implications

Although not intended for facial scanning, intraoral scanners demonstrated the potential to record partial facial data. This ability opens the door to new applications in restorative and prosthetic dentistry, particularly in the fabrication of maxillofacial prosthetics and personalized dental appliances.

Maxillofacial prosthetics can significantly enhance the quality of life for patients by restoring speech, chewing, swallowing, and facial aesthetics. Using intraoral scanners to gather supporting data for these prosthetics may improve access to care, especially in clinics without facial scanning equipment.

While intraoral scanners have limitations, they offer practical benefits when used carefully. Accurate facial scans are achievable by refining protocols—such as optimal placement of fiduciary markers and careful planning of scan sequences.

Expanding Possibilities in Digital Dentistry

This research illustrates how resourcefulness and curiosity in clinical science can unlock new potential in existing tools. With healthcare costs continuing to rise and digital technologies advancing rapidly, such innovations are vital for making care more accessible and efficient.

Rather than depending entirely on emerging technologies, dental professionals could explore innovative ways to utilize their existing tools. Although designed for intraoral use, intraoral scanners showed surprising versatility when applied in broader contexts. While full facial scanners remain the most accurate for comprehensive facial scans, intraoral scanners have shown they are a versatile and valuable alternative.

Orthodontists and other specialists may also benefit from this expanded use. Access to partial facial data could aid in planning treatments that involve jaw positioning or soft tissue considerations.

Looking Forward

This ongoing project highlights the need for further research into low-cost, high-precision imaging in dentistry. Future studies might involve scanning live patients and examining how skin texture and movement impact results. Expanding the range of anatomical models could help improve the generalizability of these findings.

As digital dentistry progresses, distinctions between intraoral and extraoral imaging technologies may continue to blur. With continuous development and enhancement, intraoral scanners may contribute more to comprehensive dental care.

Thanks to the dedication of student researchers and mentors alike, this work lays the foundation for a more versatile and inclusive future in dental imaging.

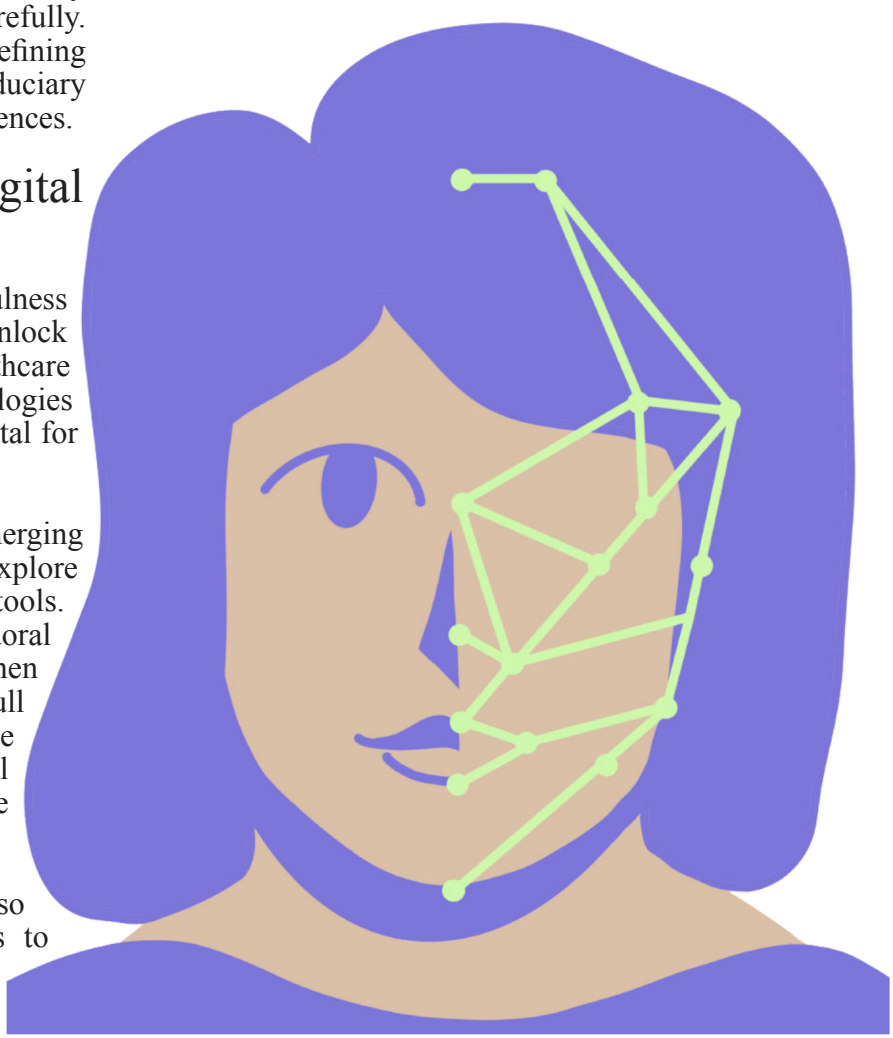


Illustration by Gina Rizzo

Funding Your Research: How to Craft a Strong Grant Application

By Nina Cintron Pregosin

The United States spends more than $800 billion annually on research and development, making it the global leader in research spending (Anderson, 2024). In 2024, at least $200 billion was provided by the federal government to fund research for national defense, energy, health, the environment, and the general advancement of knowledge (Benson, 2023). Due to recent restrictions cutting indirect costs to several institutions that distribute this funding, applying for grants may be more competitive now than ever before (Tollefson, 2025). Therefore, to successfully secure funding, careful preparation of a grant application is essential. Here are some tips on how to apply for grants to support your research.

Where to Find Funding Opportunities

Research project grants are one of the most commonly used methods to provide funding for research. Fellowships are a type of grant that provides funding to support an individual student’s training. To search for grants and fellowships to apply for, you can use Pivot, a ProQuest database designed to help students find funding opportunities. The McNair Scholars Program also has an extensive list of funding opportunities for graduate students (McNair). Many federal grants and fellowships are restricted to US citizens. Opportunities for international students can be found at the California Institute of Technologies website (Caltech). When in doubt, you can reach out to your academic department to ask what opportunities are currently available.

Choosing a Grant

First, identify the grant that best aligns with your research goals. The funding opportunity you apply for should closely match your research focus. For example, someone conducting medical research would be better suited to apply for funding through the National Institute of Health (NIH) rather than the National Science Foundation (NSF). Next, confirm your eligibility. Certain grants, such as the NSF Graduate Research Fellowship Program (NSF GRFP), specifically target early-career researchers in their first or second year of their PhD. In contrast, other grants, like the Ruth L. Kirschstein National Research Fellowship Award (F31 NRSA), are not restricted to early-stage students; however, successful applications frequently come from those who have progressed further in their studies, typically past the thesis proposal stage.

When to Apply

If you are interested in applying for a fellowship or grant, talk to your principal investigator (PI). Rather than navigating the process alone, collaborate with your PI to brainstorm and develop ideas on how to clearly and effectively present your project. Many faculty members have extensive grant-writing experience to maintain funding for their labs, so including them in your application process is beneficial.

Furthermore, your PI can advise you on selecting the ideal time to apply for funding, considering factors such as how developed your project is, how much preliminary data you have collected, and your current workload. If you anticipate a busy semester with multiple courses, challenging experiments, or important milestones like qualifying exams, it might be wise to apply during a less hectic semester to guarantee that you can dedicate the time necessary to crafting a strong grant proposal.

Making a Plan

Now that you have identified a grant and chosen a timeframe to apply, it is time to begin your application. Start by creating a detailed plan outlining your approach. Some grants, like the F31 NRSA, have numerous submission requirements including a cover letter, biosketch, transcripts, research strategy, training plan, personal

statement, budget, and letters of recommendation, to name a few. After compiling all required materials, the total length of the application is likely to exceed 50 pages. To approach these long grants, create a timeline based on the grant deadline and give yourself at least 2-3 months to put together your application. A rushed application is often easily recognized by reviewers.

To maintain progress, create a spreadsheet detailing each component of your application with individual deadlines to complete each one. This approach can serve as a tool to hold yourself accountable for completing each part of the application on time. Start writing earlier than you anticipate to accommodate for unforeseen events or setbacks and still submit your grant by the deadline.

Staying Organized

For all grant applications, it is critical to stay organized. Save your application and any relevant data in clearly and neatly labeled folders for easy access. Avoid vague file names such as "Grant_Final," which can result in confusing revisions like "Grant_Final_Final_Final" or "Grant_Final_For Real This Time." Instead, consistently label each version of your application with the date– for example, "Grant_01012025" –allowing you to track and save all previous versions and revert any changes you made. Be sure to regularly backup your data to avoid accidental loss. Storing your documents in a cloud storage service, like Google Drive, can also make it convenient for others to easily find and review your work.

If you feel lost when writing your grant application, do not hesitate to seek examples from previous students, or even from your PI. Grants such as F31, F32, K01, and R01 are commonly used as references on how to structure your application effectively.

Writing the Grant

Certain aspects of your grant, like the Specific Aims page or Research Strategy, heavily influence whether your application will be awarded. For competitive grants, more than 50% of applications are rejected before even being sent to a study section to be discussed (USDHHS, 2024). Therefore, it is crucial to spend time carefully putting together your research proposal to share why your research is so important and why it must be funded.

However, don't underestimate the value of other sections, such as your personal statement. Many programs are looking to fund the researcher, not just their research. While writing, clearly state your scientific goals, professional goals, and show that you are passionate about the work you are doing. Be specific about how this particular grant will help you achieve your goals and become a better scientist.

Before submitting your grant, have it read by as many people as possible. Make use of the Writing Center on campus to make sure your story makes sense to someone outside of your field, and to catch any mistakes you may have missed.

Finally, if writing a full-length grant application feels intimidating, try applying for smaller awards first. Practice by applying to travel scholarships for academic conferences or apply for funding through the Graduate Student Organization to get used to writing about your research project.

About the Author: Nina Cintron Pregosin is a 5th year PhD student in the Molecular and Cellular Pharmacology Program. During her time at Stony Brook University, she has received funding from W. Burghardt Turner Fellowship Program, the Scholars in Biomedical Sciences Training Program (NIH T32), the National Institute of Diabetic, Digestive, and Kidney Diseases Supplement to Promote Diversity in Health-Related Research (NIDDK), and the Ruth L. Kirschstein National Research Service Award (F31 NRSA).

References

Anderson, G. (2024). U.S. R&D increased by $72 billion in 2021 to $789 billion; estimate for 2022 indicates further increase to $886 billion. National Science Foundation. National Center for Science and Engineering Statistics. https://ncses.nsf.gov/pubs/nsf24317

Benson, Lisa S.; Gallo, Marcy E.; Harris, Laurie; Jones, Angela C.; Sekar, Kavya; Sussman, Jared S. (2023). Federal Research and Development (R&D) Funding: FY2024. Library of Congress. Congress.gov, https://www.congress.gov/crs-product/R47564

Caltech. (n.d.). External Fellowships for International Students. Caltech Graduate Studies Office. https://gradoffice.caltech.edu/financialsupport/ExternalInternational

Harvard University. (n.d.). NIH Grants. Harvard T.H. Chan School of Public Health Research Administration. https://hcsra.sph.harvard.edu/types-nih-grants/#3

McNair Scholars. (n.d.). Funding. McNair Scholars Program. https://mcnairscholars.com/funding/

Tollefson, J., Kozlov, M., Witze, A., & Garisto, D. (2025). Trump's Siege of Science: How the First 30 Days Unfolded and What's Next. Nature, 638(8052), 865–867. https://doi.org/10.1038/d41586-025-00525-1

U.S. Department of Health and Human Services (USDHHS). (2024). Frequently asked questions. National Institute of Environmental Health Sciences. https://www.niehs.nih.gov/research/supported/training/fellowships/faq

Can Psychopathy Be Defined? Great Conversations Suggest So!

By Maxaie Belmont

What defines a meaningful conversation? At its core, a good conversation is more than the exchange of words; it is an active process of engagement, mutual understanding, and transformation of perspectives. Conversations do not solely hold cognitive value, where we use reasoning to interpret information. Rather, they are also aesthetic experiences, shaping the perception of ourselves and others, as well as fostering self-awareness and reasoning.

Psychopathy is commonly characterized by a cluster of traits involving emotional dysfunctions and antisocial behaviors, often resulting in poor decision-making driven by self-interest and disregard for others (Koenigs et al., 2011; Blair, 2008). Psychopaths may frequently fail to recognize or interpret social cues beyond surface-level interactions, which may limit the capacity to extract critical contextual information and engage in appropriate moral reasoning. This includes specific deficits in social exchange reasoning, where they show difficulty in understanding reciprocal social obligations and when to enact appropriate precautions (Ermer & Kiehl, 2010). The Triarchic Model of psychopathy (Patrick, Fowles, & Krueger, 2009) describes psychopathy in terms of three dimensions: disinhibition, boldness, and meanness. While framed as deficiencies, these dimensions are better understood as disruptions in an individual’s ability to reckon with themselves and their surroundings. Reckoning can be directly achieved through one’s ability to acknowledge and challenge previous thoughts based on learned information, whether true or false. This is defined within our experiences in the physical world and those among it. The process of reckoning is crucial to an individual’s behavioral rationale. Refusing to reckon may promote psychopathic tendencies. The value behind exploring the term “reckoning” may be found within our understanding of psychopathy.

The Value of Conversation

What separates casual conversation from a good one is the act of reckoning—the willingness to be transformed by dialogue. Conversing is a defining feature of humanity serving to shape our cognitive understanding, social development, and emotional patterns. When we talk to one other, we refine our thoughts, expand our perspectives, and deepen our ability to empathize with others. The transformative impact of conversations can be understood as explicit aesthetic and cognitive features. A good conversation does not solely involve exchanging ideas; rather, it is the potential transformation of values amongst those who dialogue. Aesthetics is a philosophical framework used to explain the process of perceiving an object (Tuna, Ion, 2024). The aesthetic dimension of a conversation can be conceptualized by how effective and efficient an explanation is structured to elicit an understanding to those involved in a conversation. Meanwhile, the cognitive dimension of conversations refers to a potential adaptation of our behavior when new information has been introduced. For example, when countering an implicit bias with another bias (Mandelbaum, 2014).

Good conversations are fundamental to interpersonal connection. A good conversation is moreover a moment of reckoning, of regarding the new insights that emerge from connecting with our surroundings and others. Research suggests meaningful conversations contribute to psychological well-being, reinforcing our sense of self and our social identity (Kardas, Schroeder, & O’Brien, 2022). In maintaining one’s sense of self and others in your surroundings, we realize people and other attributes of life may matter to us as in different individual hierarchies. However, there are people who do not express empathy, connection, or concern with themselves or others. They are typically referred to as psychopaths, and how they engage in the world offers a challenge to the idea of reckoning (Kardas, Kumar, Epley 2022).

Psychopathy and the Disruption of Dialogue

By analyzing psychopathy through the lens of reckoning, we can gain deeper insight into its nature—not as a simple lack of morality, but as a refusal or resistance to engaging in the very processes that define human connection. The

definition of psychopathy is a controversial subject in psychological and philosophical discourse. A broad range of personality traits in someone who is potentially psychopathic may lack their sense of empathy and perform manipulative behaviors (Anderson & Kiehl, 2014; Wolf et al., 2015; Owens et al., 2017). Moreover, the tendency to be dissociative is a disruption in the ability to reckon with one's actions, emotions, and moral consequences. Unlike other personality disorders that may involve emotional dysregulation or impaired cognition, psychopathy serves as a descriptive term that may emphasize the absence of aesthetic and cognitive features of reckoning derived from a conversation. As mentioned earlier, the Triarchic Model of psychopathy (Patrick, Fowles, & Krueger, 2009) breaks psychopathy into three components: disinhibition, boldness, and meanness. Disinhibition is marked by impulsivity, irresponsibility, and difficulty regulating emotions and behavior, often manifesting as poor time management due to inadequate planning and an inability to delay gratification. For example, Watson and Clark (1993) defined disinhibited individuals as "reckless and oriented primarily toward the feelings and sensations of the immediate moment" (p. 269). Boldness is categorized as fearlessness, often paired with reduced functions of the brain's amygdala, which processes emotion (Drislaine et al., 2014).

Meanness is an externalizing psychopathic trait, with aggression, irritability, and callousness as common expressions (Dotterer et al., 2017). For instance, a study published in Frontiers in Psychology discussed how psychopathy is associated with challenges in responding to aversive stimuli and in recognizing fearful expressions, functions thought to rely on the amygdala. These factors may contribute to difficulties in social interactions and a tendency toward social isolation (Bakiaj et al., 2025). Additionally, research indicates that individuals with psychopathy often struggle to recognize non-dominant social cues, which can lead to misinterpretations of social interactions and potentially result in aggressive behavior. This pattern may further isolate them from their environment (Jiang et al., 2024).

Reinterpreting Psychopathy with a New Lens

An alternative, philosophically grounded interpretation of the triarchic dimensions emerges when each is examined not solely as a behavioral trait, but as a disruption in one's capacity to engage meaningfully with time, boundaries, and moral recognition. Disinhibition may be reinterpreted as a difficulty with adjusting to time. This means not simply impulsivity in the moment, but a disorientation in how one engages with the past, present, and future; such as consistently running late, not because of negligence, but because one's internal rhythm fails to sync with external structures like a shared schedule. Boldness reflects a broader disruption in one's relationship to limits. Here, the issue is not merely fearlessness, but a resistance to accepting external constraints, such as the inability to follow the rules of a game, or social norms more broadly, because they are experienced as arbitrary impositions rather than meaningful boundaries. Meanness signals a more fundamental difficulty with cruelty. It reflects a rejection of the vulnerability that comes with acknowledging that one can be wrong, and that others are equally entitled to their own emotional realities.

Across all three dimensional nodes, we observe a common denominator: a distortion of the aesthetic and cognitive dimensions that promote moments of reckoning from potentially good conversations. Psychopaths refuse to reckon with their environment because they likely reason it does not make space for them, and this absence of affirmation contributes to a self-referential and increasingly isolated mind. Psychopaths may disengage from their environment when they perceive it as unaccommodating or invalidating, and in the absence of meaningful social affirmation, their cognitive state becomes increasingly self-contained and detached from external reality.

Reckoning and the Possibility of Change

To reckon with the world is not merely to reflect, but to actively engage with reality. It is the acceptance of consequences, an awareness of other people, and understanding of oneself, all in a constant and honest process of living and doing. Psychopathy can be understood as a disruption of this process—not a lack of intellectual development, but a refusal or inability to

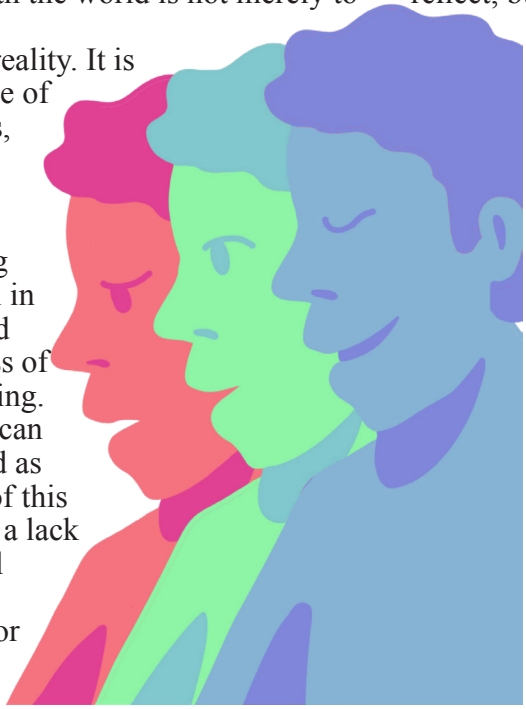


Illustration by Gina Rizzo

engage in self-reflection based on interactions with others.

Without reckoning, moral development remains incomplete, and interpersonal relationships become transactional rather than meaningful (Abrams, 2023). It is not that a person diagnosed with psychopathy lacks or has cognitive inabilities, it is that they refuse to reckon from conversations with others. This refusal is not mere absence. The individual with psychopath is not incapable of connection; rather, they are in rebellion against it. This perspective is supported by insights from Psychology Today, which describe how people with psychopathy “rebel against the fabric of society,” infiltrating relationships and causing disruption within social structures (Rule, 2022). However, recent psychological research suggests that psychopathy is not entirely immutable. Studies indicate that while psychopathic individuals may struggle with empathy and emotional depth, they can develop compensatory strategies that allow them to function in social environments (Epley et al., 2022). These findings imply that structured interventions could potentially cultivate a form of cognitive reckoning for individuals with psychopathy, enabling more ethical decision-making.

Conclusion

A good conversation is more than an exchange of words; it is an act of mutual reckoning, a process by which individuals engage with one another and with themselves. Conversations are processes that help us navigate our world and psychopathy represents a profound disruption in this process, preventing individuals from engaging in the type of reckoning that allows for self-awareness and moral responsibility. The Triarchic Model of psychopathy provides a useful framework for understanding these disruptions, but deeper philosophical analysis suggests that psychopathy is not simply a set of deficits but a failure of engagement with reality. Reckoning—that engagement which confronts, reflects, and integrates new understanding—remains central to human experience.

Understanding psychopathy through this lens opens new avenues for both psychological research and moral philosophy. If psychopathy is not a lack but a distortion of reckoning, then interventions should focus not just on behavior but on cognitive restructuring and on teaching individuals not just to follow social norms but to engage meaningfully with their own moral landscape. Psychopathy challenges the boundaries of human connection, insight into what makes connection possible in the first place. At our core, meaningful human interaction depends on our ability to reckon with ourselves, with others, and with the world we inhabit.

References:

Abrams, Z. (2023, November 1). Conversations are essential to our well-being. Psychologists are exploring the science of why they’re so powerful. Monitor on Psychology, 54(8). https://www.apa.org/monitor/2023/11/conversations-key-to-wellbein.

Anderson, N. E., & Kiehl, K. A. (2014). Psychopathy: Developmental perspectives and their implications for treatment. Restorative Neurology and Neuroscience, 32(1), 103–117. https://doi.org/10.3233/RNN-139001.

Clark, L. A., & Watson, D. (2008). Temperament: An organizing paradigm for trait psychology. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), Handbook of personality: Theory and research (3rd ed., pp. 265–286).

Guilford Press.

Drislane, L. E., Patrick, C. J., & Arsal, G. (2014). Clarifying the content coverage of differing psychopathy inventories through reference to the Triarchic Psychopathy Measure. Psychological Assessment, 26(2), 350–362. https://doi.org/10.1037/a0035152.

Dotterer, H. L., Waller, R., Neumann, C. S., Shaw, D. S., Forbes, E. E., Hariri, A. R., & Hyde, L. W. (2017). Concurrent and developmental correlates of psychopathic traits using a triarchic psychopathy model approach. Journal of Abnormal Psychology, 126(7), 859–876. https://doi.org/10.1037/abn0000302.

Bakiaj, R., Pantoja Muñoz, C. I., Bizzego, A., & Grecucci, A. (2025). Unmasking the dark triad: A data fusion machine learning approach to characterize the neural bases of narcissistic, Machiavellian, and psychopathic traits. The European Journal of Neuroscience, 61(2), e16674. https://doi.org/10.1111/ejn.16674.

Blair, R. J. R. (2008). The amygdala and ventromedial prefrontal cortex in morality and psychopathy. Trends in Cognitive Sciences, 11(9), 387–392. https://doi.org/10.1016/j.tics.2007.07.003.

Caban, S., Makos, S., & Thompson, C. M. (2023). The role of interpersonal communication in mental health literacy interventions for young people: A theoretical review. Health Communication, 38(13), 2818–2832. https://doi.org/10.1080/10410236.2022.2121473.

Ermer, E., & Kiehl, K. A. (2010). Psychopaths are impaired in social exchange and precautionary reasoning. Neuropsychology, 24(5), 620–626. https://doi.org/10.1037/a0019708.

Fisher, C. L., Goldsmith, D., Harrison, K., Hoffner, C. A., Segrin, C., Wright, K., & Miller, K. (2012). Communication and mental health: A conversation from the CM Café. Communication Monographs, 79(4), 539–550. https://doi.org/10.1080/03637751.2012.727284.

Jiang, Y., Tong, L., Cao, W., & Wang, H. (2024). Dark triad and relational aggression: The mediating role of relative deprivation and hostile attribution bias. Frontiers in Psychology, 15, 1487970.

https://doi.org/10.3389/fpsyg.2024.1487970.

Kardas, M., Schroeder, J., & O’Brien, E. (2022). Keep talking: (Mis) understanding the hedonic trajectory of conversation. Journal of P Personality and Social Psychology, 123(4), 717–740. https://doi.org/10.1037/pspi0000379.

Kardas, M., Kumar, A., & Epley, N. (2022). Overly shallow? Miscalibrated expectations create a barrier to deeper conversation. Journal of Personality and Social Psychology, 122(3), 367–398. https://doi.org/10.1037/pspa0000281.

Koenigs, M., Baskin-Sommers, A., Zeier, J., & Newman, J. P. (2011). Investigating the neural correlates of psychopathy: A critical review. Neuropsychology Review, 21(4), 379–401. https://doi.org/10.1007/s11065-011-9187-9.

Mandelbaum, E. (2016). Attitude, inference, association: On the propositional structure of implicit bias. Noûs, 50(3), 629–658. https://doi.org/10.1111/nous.12089.

Epley, N., Kardas, M., Zhao, X., Atir, S., & Schroeder, J. (2022) Undersociality: Miscalibrated social cognition can inhibit social connection. Trends in Cognitive Sciences, 26(5), 406–418.https://doi.org/10.1016/j.tics.2022.02.007.

Owens, E. S., McPharlin, F. W. H., Brooks, N., & Fritzon, K. (2017). The effects of empathy, emotional intelligence and psychopathy on interpersonal interactions. Psychiatry, Psychology and Law, 25(1), 1–18. https://doi.org/10.1080/13218719.2017.1347936.

Patrick, C. J., Fowles, D. C., & Krueger, R. F. (2009). Triarchic conceptualization of psychopathy: Developmental origins of disinhibition, boldness, and meanness. Development and Psychopathology, 21(3), 913–938. https://doi.org/10.1017/S0954579409000492.

Rule, W. (2022, October 3). The rebellion of the psychopath. Psychology Today. https://www.psychologytoday.com/us/blog/surviving-the-female-psychopath/202210/the-rebellion-the-psychopath.

Tuna, E. H., & Ion, O. (2024). Apt perception, aesthetic engagement, and curatorial practices. Estetika: The European Journal of Aesthetics, 61(1), 38–53. https://estetikajournal.org/articles/10.33134/eeja.352.

Wolf, R. C., Pujara, M. S., Motzkin, J. C., Newman, J. P., Kiehl, K. A., Decety, J., Kosson, D. S., & Koenigs, M. (2015). Interpersonal traits of psychopathy linked to reduced integrity of the uncinate fasciculus. Human Brain Mapping, 36(10), 4202–4209. https://doi.org/10.1002/hbm.22911.

Reflections as an Artistic Director

By Laiba Mahmood

I was waiting at the elevator on the first floor of Staller, the one right across the white gallery where exhibits constantly rotate. It was just before 10AM, when my photography class on the 3rd floor would begin. The numbers on top of those elevators were changing, but The bulletin board next to it caught my attention. With its hundreds of staples-curated from flyers that had been plastered and ripped off in the past who-knows-how-many decades, a call for artists was stuck behind a Canva illustrated waffle fundraiser flyer. I wanted to send an email and join, but my interpersonal awkwardness stopped me. I figured, they probably have enough people, why would I be needed?

A few days later, I received an email including an invitation to meet with SBU Graduate Arts & Sciences Magazine, and I believe most Digital Art minoring students received it. I usually never join Zoom meetings willingly, but I attended the meeting anyway. A couple of months later, my art was the front cover of our first issue.

After months of hard work from the team, the magazine was released and received wonderful feedback, and I won first place for Best Original Work at the Annual Student Council Media Awards of 2024.

This year, Ava Nederlander and Jennifer L. O'Connor spoke to me about being promoted to Artistic Director. It carries a lot of dedication and responsibility, but looking at the team's illustration and ideas is incredibly riveting, and remembering the reason why this work is being done is so important. The Graduate students who work on this magazine have the concept of bringing all the departments at Stony Brook together and celebrating the different areas of study. There's a quote by Leonardo Da Vinci that comes to mind: "To develop a complete mind: Study the science of art; Study the art of science. Learn how to see. Realize that everything connects to everything else."

Although there's the misconception that art and science are far from each other, with one studying objective and empirical methods, while the other is a more subjective form. The process of creating art draws inspiration from many scientific theories with its use of observation and experimentation. Creativity when studying scientific concepts has proven to boost understanding.

It's easy to believe that artists wake up with an innate drive to create, but creativity is a muscle that needs to be exercised through practice and informed decision making. My journey to creating the magazine's cover art, and all of my art, has never been a simple rush of inspiration that pops into my head, but it's a series of carefully considered choices.

For the cover, I chose each color to reflect our natural world throughout the seasons. The way the sun interacts with snow and ice, and with air molecules scattering blue and violet light wavelengths, winter is often associated with those colors. There's a similar explanation for each season depicted on the cover, but it shows how intertwined science is with any art concept. What inspired me really was the four seasons and what we associate them with. I also illustrated the filler on page 3, the Spring Page on page 39, and the graphics for the interview spread and grant writing. Along with this, I formatted the layout of this entire 64-page magazine, which required a bit of experimentation and reading. It was vital for me to establish consistent margins and fonts, to balance the negative space and flow of each article. Every page layout was thoughtfully designed with added images and illustrations, and for me, each page took half an hour to curate. The importance of geometry in visual appeal and in graphic design shows me that realization where everything connects to everything else.

I think about how much I've grown as an artist since that moment at that elevator. Working with the magazine has taught me the importance of I've learned to jump into opportunities that I feel drawn to, and embrace the bridge between art, science, and our communities.

Molecular Clock

by Melanie Nielson

Orchids on the wing no strings
Orchids oblige so waxy in April
Tell me your dream
In orphic hum cymbidium

Ding a ling a ling a ling
Even insect rain
Of now is corsage
Orchid my dear pick up

Attoseconds punk our séance
Of sounds held in thought
Fertilized by insects
Do moths change too?

In this merry hell of mammal wipe-out
Dream yourself green pollinium
Lichen love bubbles
For nonsense and protection

Spinning Wheel

by Mahnoor Fatima

Tis' been long, brother
And the eve is drawing nigh
Will you stop and be with me
Or leave me to lament and sigh
Ma and pa are away, Tessa fast asleep
And elseone busy with their carrot and reel
Won't you come on down, keep me company
And take a break from your round, spinning wheel
Do you find it enthralling, do you find it ecstatic
Or are you merely blinded by the carrot's greed
Can't you see this indulgence is but pain and agony
Just look at your feet; they hurt and swell and bleed
I see you won't come, so I'll take my leave
I think it's best if I set out and for myself see
Why you can indulge in your props and not me
Maybe then I'll come and spin round the wheel with thee

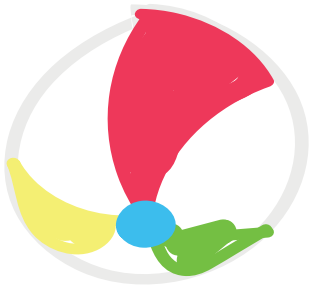
Illustration by Ming-Wei Chou

Salt

By Mayurakshi Das

Crimson desert kissed by the sky
cradles the swollen sun between two dunes.
Heat-strokes the sand and surface of a
narrowed river split, like a slit vein
spilling blood across scorched terrain.

Moisture siphoned by acute heat as
the river froths vapor, a force of fatal beauty.
Eventide, salt dressed the desert in a mirage.
The novae above, treading beneath feet. Walk on stars
towards mounds of darkness, where the heart craves to be.



Building a Community of African Graduate Students for Impact

By Alexander Kwakye

The Birth of AGSA

In Fall 2022, as the world was emerging from the pandemic, a group of African graduate students at Stony Brook University, including myself, began organizing periodic luncheons on campus. These gatherings were an opportunity to discuss our research and academic experiences. At the time, coordinating these lunches was easy since many of us were taking a Biometry class together, which meant we saw each other regularly. These lunches not only allowed us to strengthen our connections but also provided a platform to meet students I had never met before. However, as we became more immersed in our research and academic responsibilities, it became increasingly difficult to maintain these regular meetings. In an effort to reinvigorate our sense of community, Alex Chege, a Ph.D. student in the Department of Ecology and Evolution, and Winfred Mbogo, a former graduate student in the Anthropology Department, organized a lunch for several graduate students and myself to meet with Dr. Dino Martins, Professor at Stony Brook in the School of Marine and Atmospheric Sciences (SOMAS). During this lunch, we discussed collaborative opportunities, sparking further inspiration for fostering a broader sense of community. It became apparent that there needs to be a well-organized student body at Stony Brook, which will specifically facilitate activities to enhance the professional growth of graduate students from Africa.

(Above) AGSA Executive Board Member, Rupert Ikeh, performing wetland ecology fieldwork.

Motivated by this conversation, Esther Nosazeogie, PhD student in SOMAS, Alex Chege, and Rupert Ikeh, who are PhD students in Ecology and Evolution, and I conceived the idea of the African Graduate Students’ Association (AGSA), which was officially established in Fall 2024. AGSA is crucial for creating a sense of belonging and intellectual community for African graduate students at Stony Brook University. The organization is dedicated to building connections that promote the intellectual growth of its members, as well as advancing initiatives that support the African continent. Our vision was clear: to create a supportive community that would be beneficial not only to current African graduate students but also to future generations. The organization is currently led by Florence Agbomo, a Ph.D. student at the Interdepartmental Doctoral Program in Anthropological Sciences (IDPAS), as the President; Alex Chege and Rupert Ikeh as the Vice President and Organizing Secretary, respectively; and Elsie Otieno, Ph.D. student in Chemistry as the General Secretary.

(Above) AGSA members discuss finding community over lunch.

Fostering Intellectual Growth through Community

The intellectual development of graduate students is often driven by the rigorous training we undergo within our respective academic programs. Yet, an equally important aspect of our intellectual growth goes beyond formal education—this is the cultivation of intuition and the development of a more holistic understanding of our disciplines. In his book, Mathematica, A Secret World of Intuition and Curiosity (Mathematica, 2018), David Bessis discusses cognition as a blend of reason and intuition, concepts also explored by Daniel Kahneman as Systems 1 and 2 thinking(Kahneman, 2003). While formal education often emphasizes reasoning, much of our thinking is driven by intuition. For instance, the learning of mathematics, with its formal systems and symbols, is underpinned by intuitive understanding—an understanding that can only be expanded through exposure to new ideas and perspectives. When a few of us took Biometry together, we would gather to study as a group, and I found myself understanding concepts better as a result of these study sessions because we discussed more intuitive explanations.

AGSA aims to facilitate the growth of our intuitive intellect by creating spaces for dialogue and community-building. Small group discussions, talks by guest speakers, and even group trips to museums or cultural sites can provide opportunities for members to expand their intellectual horizons and enhance their intuitions. These activities will alleviate feelings of intellectual isolation, allowing members to deepen their understanding of their respective fields while building lasting connections with peers.

The Role of AGSA in the Broader African Context

AGSA's efforts are not only focused on the academic development of its members but also on contributing to the intellectual advancement of the African continent. Stony Brook University has already made significant investments in African-focused intellectual initiatives such as the Centre ValBio in Madagascar and the Turkana Basin Institute (TBI) in Kenya. Research at the TBI, for instance, has made groundbreaking contributions to our understanding of human evolution through the discovery of hominin fossils. Dr. Dino Martins directs the TBI and will serve as AGSA's inaugural faculty advisor. The contributions of African scholars such as Dr. Martins at TBI demonstrate how African scholars are contributing to knowledge that impacts not only the continent but the entire world.

As AGSA grows, we will continue expanding our outreach, organizing activities and events that highlight the African intellectual tradition and the contributions of African scholars, both past and present. These efforts will support the ongoing development of the

(Above) AGSA members Esther Nosazeogie, Alexander Kwakye, and Elsie Otieno.

African graduate student body at Stony Brook while fostering a broader understanding of African scholarship globally. An area of African scholarship with enormous global significance in modern times is African philosophy. African philosophical thought has understandably been siloed based on ethnicity. However, since at least the mid-20th century, many scholars have attempted to link these thoughts, which led to the so-called ethnophilosophy (Agada, 2023). Contemporary philosophers are organizing these philosophical thoughts into more rigorous frameworks and traditions such as Ada Agada’s Consolationism (Agada, 2018, 2021). Consolationism stems from a widely held view that African ontology is holistic, interconnected, or interdependent. This tradition has much to teach as the world becomes more connected through the Internet. AGSA, through its activities, will contribute to espousing these philosophical traditions

The Importance of Diverse Voices in African Narratives

One of the key objectives of AGSA is to encourage the inclusion of diverse voices in the narrative of Africa’s history, present, and future. Stories about Africa, when told by others, can sometimes be misunderstood or misrepresented, not due to ill intentions but because lived experiences offer a more nuanced and authentic perspective. Chinua Achebe’s account of the Nigerian Civil War in his book There Was a Country is a prime example of how personal experience lends authority to historical narratives (Achebe, 2013). Achebe’s perspective, shaped by his role as an active participant, provides a richer, more intimate understanding of the conflict compared to a third-party account.

However, Achebe’s perspective as an Igbo man may also introduce biases, as his empathy for the Biafran cause is evident. In addition, when scholars from outside the continent travel to observe life on the continent, they go with preformed hypotheses that may be hard to prove or disprove within months of living on the continent. Literary critic and historian Henry Louis Gates Jr. spent nearly 12 months collecting data for his 6-episode TV series Wonders of the African World (Voice of America, 2017). Yet, one year is a very short time to provide a meticulous understanding of the present life and history of such a diverse continent. Thus, given our human tendency to essentialism (Lies That Bind, 2011), such

(Above) AGSA Executive Board Member, Florence Aghomo, conducting fieldwork in Madagascar, searching for a population of an endangered lemur species.

enterprises usually end with projecting theoretical constructs and expectations onto fragmentary conversations between one or two actors, further entrenching predetermined ideas. These highlight the need for plural voices in narrating African history, with each perspective adding depth and complexity to the narrative. As members of AGSA, many of us come from disciplines like anthropology, sociology, and evolutionary science among others, all of which contribute to shaping the stories of humanity, particularly African history. We are committed to engaging with diverse ideas and perspectives that shape the future of Africa and its global influence.

Celebrating African Culture and Diversity at Stony Brook

Culturally, AGSA is dedicated to showcasing the rich diversity of Africa's cultures, lifestyles, and traditions. From Cairo along the Nile Valley to Mombasa, Zanzibar, and Lagos, then to Accra and Kumasi in Ghana, continuing to Dakar and down south to Cape Town, we celebrate the varied music, food, and customs that make Africa unique. These cultural exchanges will not only enrich Stony Brook's international community but also create a platform for African students to share and celebrate their heritage. We plan to collaborate with other culturally oriented organizations to host events that highlight Africa's cultural richness. These events will strengthen the bond between African graduate students at Stony Brook and create opportunities for dialogue and learning.

Conclusion

Ultimately, AGSA seeks to foster intellectual growth, community building, and the advancement of African scholarship. By addressing intellectual isolation and supporting initiatives that contribute to the African continent's progress, AGSA will help African graduate students integrate into the Stony Brook community while making meaningful contributions to their academic journeys. Our collective efforts will not only benefit the members of AGSA but will also extend beyond the Stony Brook campus, contributing to the intellectual and cultural development of the African continent.

References

Achebe, C. (2013). There was a country: A memoir. Penguin Books.
Agada, A. (2018, September 27). Consolation philosophy and the struggle of reason in Africa. Aeon; Aeon Magazine. https://aeon.co/essays/consolation-philosophy-and-the-struggle-of-reason-in-africa
Agada, A. (2021). Consolationism and comparative African philosophy: Beyond universalism and particularism. Routledge.
Agada, A. (Ed.). (2023). Ethnophilosophy and the search for the wellspring of African philosophy (1st ed.). Springer Nature.
Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. American Economic Review, 93(5), 1449–1475.
Lies That Bind. (2011, June 28). Kwame Anthony Appiah. https://appiah.net/books/carousel/
Mathematica. (2018, August 10). Yale University Press. https://yalebooks.yale.edu/book/9780300270884/mathematica/
Voice of America. (2017, February 28). PBS Television Series a "Myth-Busting" Journey Through African History. Youtube. https://www.youtube.com/watch?v=qVYzpm5S9CI

(Above) AGSA Executive Board Member, Elsie Otieno, setting up a synthesis reaction in the Chemistry lab.

Shining Light on Quantum Dots

By Caitlin V. Hetherington

When I tell people that I am a Ph.D. student in the Chemistry department, the first, most common image that pops into their head is of me in safety goggles, a lab coat and gloves, standing at a bench in a chemistry lab all day, maybe mixing different colored liquids together to make another liquid of an entirely different color. Even though that sounds cool, I don’t actually work in a chemistry lab at all: I don’t touch any fancy instruments, expensive chemicals or glassware. In fact, all of my experiments are done using my computer, I don’t even need to be inside the Chemistry building. How is this possible? I run my experiments from the comfort of my laptop by remotely connecting to a large, high-speed supercomputer located on campus, named SeaWulf. SeaWulf is capable of running complicated calculations in short amounts of time, which allows me, and many others at Stony Brook, to carry out important research in Chemistry.

My research focuses on solving environmental problems that our planet and humanity are facing. Everyone knows that nowadays fossil fuels are our main source of energy, but they are also the main causes of pollution and other environmental problems (Perera, 2017). It is therefore very important that we come up with clean alternative energy sources. One very promising alternative is solar cells. These devices inside a solar panel can capture the energy from the sun and transform it into electricity for use in our electrical devices like computers. However, one of the reasons why solar cells are not commonly used in everyday life is that they are not very efficient. In fact, the maximum theoretical efficiency of a standard solar cell was calculated to be only around 30% (Shockley, Queisser, 1961). This means that if the energy from the sun captured by the solar cell was 100%, the maximum amount of energy that can be transformed into electricity is only 30%, meaning at least 70% of the energy captured by the solar cell is lost, instead of being converted into electricity. Further research is therefore needed in order to improve the efficiency of solar cells.

At the heart of my research is the desire to find materials that can be used inside solar cells to increase their efficiency. That way we could solely depend on these clean and renewable energy sources, without the need for polluting processes and chemicals. One such material that has great potential for use in solar cells is called a quantum dot (QD). These materials are known as nanomaterials because they are a few nanometers long in diameter (1 nanometer equals 10-9 meters). In fact, a QD has the same relationship to a soccer ball as a soccer ball has to the size of the Earth, so it is very small. They are made up of clusters of atoms, can be different sizes and the most interesting thing about them is that their properties depend on their size. For example, a smaller QD of around 2 nanometers (nm) in diameter will be blue, whereas a larger QD of around 7 nm will be red (Rabouw, de Mello Donega, 2016). Also, when you shine light on a QD, it glows a different color depending on its size. Importantly, QDs have the ability to capture different parts of the sun depending on their size, making them very good candidates for light harvesting. It was predicted that using quantum dots in solar cells could potentially double their efficiency (Ross, Nozik, 1982). However, because the process during which energy from the sun captured by the solar cell is lost instead of being converted into electricity is very fast, it is very difficult to reach this efficiency and there are currently no reports of such highly efficient QD solar cells. Investigation of what affects the speed of this process in QDs is therefore key in the design of more efficient QD solar cells.

Through my work with my Ph.D. advisor Benjamin Levine, IACS Endowed Professor of Chemistry, I strive to figure out how we can increase

the efficiency of solar cells using quantum dots. To do this, I run chemistrycalculations on my computer to see what happens when we shine light on a quantum dot, modeling the sun shining on a quantum dot inside a solar cell. After several years of work, I have found important information about what happens to several different quantum dots after shining light on them. My results show that, depending on what the quantum dot looks like, there are different mechanisms, involving vibrations of the material in specific ways, that may lead to loss of energy. Understanding how the energy captured by different quantum dots in solar cells is lost instead of being converted into electricity, brings us one step closer to a cleaner planet with more efficient solar cells!

References
Perera F. (2017). Pollution from Fossil-Fuel Combustion is the Leading Environmental Threat to Global Pediatric Health and Equity: Solutions Exist. International journal of environmental research and public health, 15(1), 16. https://doi.org/10.3390/ijerph15010016
Shockley W., Queisser H. J. (1961). Detailed Balance Limit of Efficiency of pn Junction Solar Cells. Journal of Applied Physics, 32 (3), 510–519. https://doi.org/10.1063/1.1736034
Rabouw, F.T., de Mello Donega, C. (2016). Excited-State Dynamics in Colloidal Semiconductor Nanocrystals. Topics in Current Chemistry, 374, 58. https://doi.org/10.1007/s41061-016-0060-0
Ross R. T., Nozik A. J. (1982). Efficiency of hotcarrier solar energy converters. Journal of Applied Physics, 53 (5), 3813–3818. https://doi.org/10.1063/1.331124

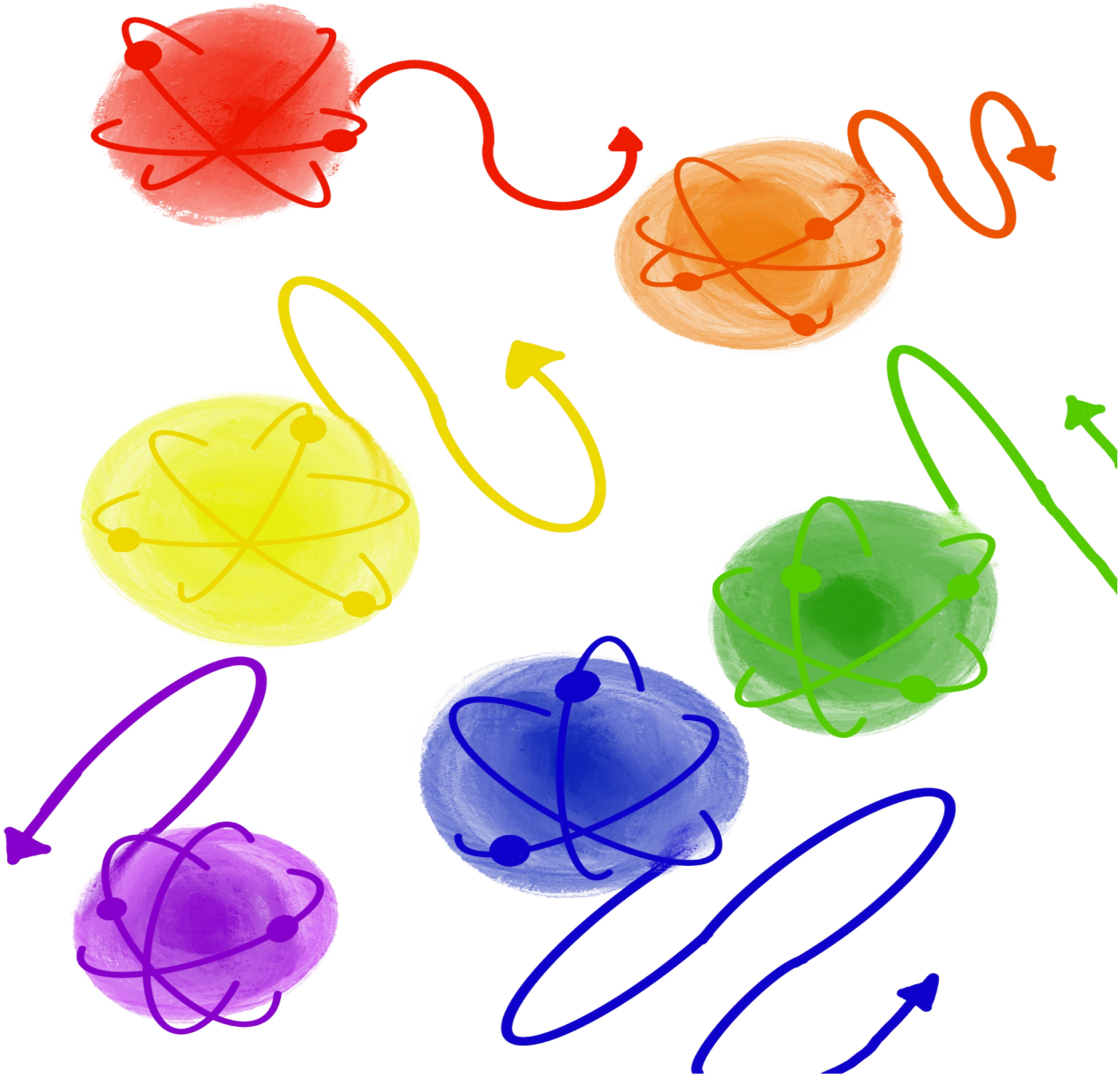


Illustration by Amanda Sirna

Source of the Brain Taxi

By Mohammad Fauzan

Imagine you’re currently in New York City, standing inside your office building, located downtown. You have an important meeting with a potential investor requiring you to travel to another building, located all the way uptown. You consider walking, but you notice it’s pouring rain outside and you’ve left your umbrella at home– you don’t want to get wet in the rain. You consider taking the subway trains, but it will take a while and you can’t risk being late. You decide that the next best thing to do is to call a taxi. This taxi arrives on time, picks you up at the front of your building, and navigates through the chaotic wet city streets to get you all the way to your destination uptown. Now you’ve arrived safely, quickly, and without a single drop of water on you.

What if I told you this little story is happening inside all of our brains right now at the molecular scale? What I just described to you is the point of view of very important molecules in our brains called endocannabinoids. These molecules are part of a larger system called the endocannabinoid system, which helps to regulate various bodily functions such as our stress, anxiety, mood, appetite, immune response, and even our perception of pain (Morena et al., 2016, Katona et al., 2012, Araque et al., 2017, Scheyer et al., 2023). They flow through the neurons in our brains and bind to tiny receptors called cannabinoid receptor 1 (CB1r) which dampens the communication between the neurons. This can be particularly beneficial when our brains get overstimulated or over stressed and require less cross-talk between our neurons (Howlett et al, 2017). However, when we have an imbalance of endocannabinoids in our brains, it can lead to many neurological and neuropsychiatric problems such as Alzheimer’s disease, Huntington’s disease, depression, anxiety disorders, and others (Basavarajappa et al., 2017, Marco et al., 2011). There are some profound questions that have yet to be answered about the endocannabinoid system. For decades, scientists in this field have asked how these molecules are transported in between our brain cells– from one neuron to another neuron? And where does the help come from? Our brains are mostly made out of water; some inside of the cells and some in between, like in the synapse which is the space between two neurons where signals are transferred. The endocannabinoids are one of the molecules that have to make this trek through the synaptic space, however the endocannabinoids are hydrophobic, meaning they’re “scared of water”. In fact, they are essentially like fats and oils. So on their own, it would be like trying to push a drop of oil through water. This meant there had to be something to help carry the endocannabinoids through the watery synapse, but no one knew what that was until now.

Our lab has recently identified a protein called fatty acid binding protein 5, or FABP5 for short, that helps to shuttle these endocannabinoids—similar to a New York City taxi. Originally, these proteins were known for binding to and moving fat molecules only inside our cells. We found that this protein in the brain also helps to move the endocannabinoids from one neuron to another, just as a taxi will take its customers from building A to building B. However, another question remained–where was this brain taxi coming from? Was the taxi located in a specific region or in a specific type of cell in the brain? Where was the central hub where these brain taxis were being deployed from?

My research pursued to find the source of this brain taxi, aka the FABP5 protein, using mouse models. Having similar genetics to us, mice are commonly used for preclinical studies. We have

tools in our lab that allow us to remove or introduce the FABP5 protein anywhere in the mice's brains. One tool that allows us to accomplish this is with the use of Adeno-Associated Viruses or AAVs. These AAVs are non lethal and act as a trojan horse that carry the instructions to either make the FABP5 protein or to delete it inside of a cell. Once inside the cell, they will produce a green fluorescent protein which will act as a molecular flare to help us mark the location of the infected cell. We can then tag various other proteins in the mouse brain with fluorescent markers that can emit different colored signals. Using high-powered microscopes, we can pick up on these signals and visualize the layout of the mouse brain, leading to identifying the correct location of the brain taxi. We found that star-shaped cells, known as astrocytes, are full of these proteins. They contain a reservoir of FABP5s inside their cell bodies revealing, essentially, the central hub for the brain taxi. The astrocytes in our brains are fundamental to our brain health, especially for our neurons, as the astrocytes provide nutrients, energy, synapse maintenance, and protection.8 In addition, the collection of FABP5 inside the astrocytes is responsible for transporting the endocannabinoids through the synaptic space in between our neurons (Fauzan et al., 2022, Oubraim et al., 2025).

Why would this matter to you? Think about the last time you felt stressed or anxious. Maybe you went through a heartbreak or had a panic attack. Maybe it was something even severe such as suffering from a seizure. What if there was a drug, some type of medication that you can take to help decrease these negative conditions, by targeting the brain taxi, or even better– by targeting the central hub or reservoir of FABP5? The findings in my research have identified the source of the brain taxi, responsible for transporting endocannabinoids and now it may lead to new therapeutics to regulate its behavior. For example, giving it gas to work harder or even killing the engine to stop it from transporting the endocannabinoids. Next time you're feeling stressed or anxious, I hope you can appreciate the little taxi in your brain that is working hard to transport those stress-relieving molecules.

References:

Araque, A., Castillo, P.E., Manzoni, O.J., and Tonini, R. (2017). Synaptic functions of endocannabinoid signaling in health and disease. Neuropharmacology 124,13-24.https://doi.org/10.1016/j.neuropharm.2017.06.017.

Basavarajappa, B. S., Shivakumar, M., Joshi, V., & Subbanna, S. (2017). Endocannabinoid system in neurodegenerative disorders. Journal of neurochemistry, 142(5), 624–648. https://doi.org/10.1111/jnc.14098

Fauzan, M., Oubraim, S., Yu, M., Glaser, S. T., Kaczocha, M., & Haj-Dahmane, S. (2022). Fatty Acid-Binding Protein 5 Modulates Brain Endocannabinoid Tone and Retrograde Signaling in the Striatum. Frontiers in cellular neuroscience, 16, 936939. https://doi.org/10.3389/fncel.2022.936939

Gradisnik, L., & Velnar, T. (2023). Astrocytes in the central nervous system and their functions in health and disease: A review. World journal of clinical cases, 11(15), 3385–3394. https://doi.org/10.12998/wjcc.v11.i15.3385

Howlett, A.C., and Abood, M.E. (2017). CB(1) and CB(2) Receptor Pharmacology. Adv Pharmacol 80, 169-06. https://doi.org/10.1016/bs.apha.2017.03.007.

Katona, I., and Freund, T.F. (2012). Multiple functions of endocannabinoid signaling in the brain. Annu Rev Neurosci 35, 529-558. https://doi.org/10.1146/annurev-neuro-062111-150420.

Marco, E. M., García-Gutiérrez, M. S., Bermúdez-Silva, F. J., Moreira, F. A., Guimarães, F., Manzanares, J., & Viveros, M. P. (2011). Endocannabinoid system and psychiatry: in search of a neurobiological basis for detrimental and potential therapeutic effectsFrontiers in behavioral neuroscience, 5, 63. https://doi.org/10.3389/fnbeh.2011.00063

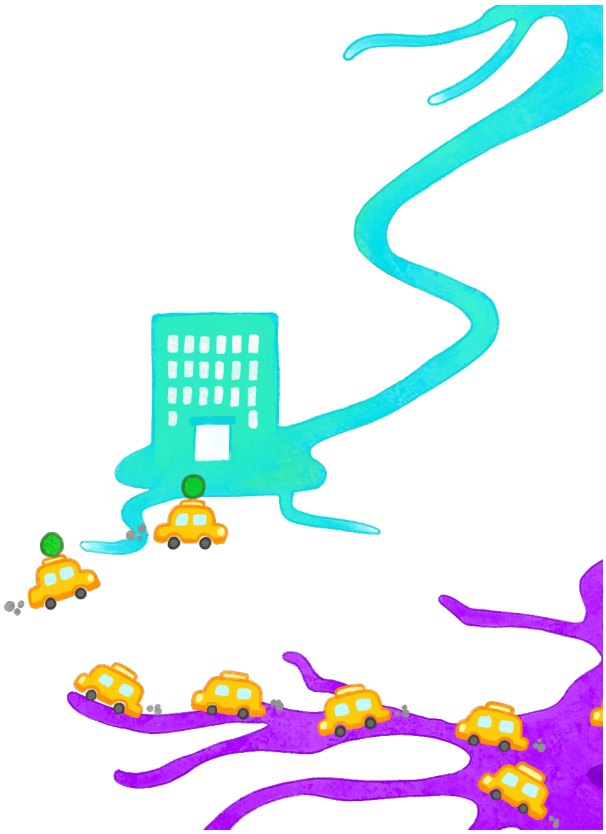
Morena, M., Patel, S., Bains, J. et al. (2016). Neurobiological Interactions Between Stress and the Endocannabinoid System. Neuropsychopharmacol 41, 80–102. https://doi.org/10.1038/npp.2015.166

Marco, E. M., García-Gutiérrez, M. S., Bermúdez-Silva, F. J., Moreira, F. A., Guimarães, F., Manzanares, J., & Viveros, M. P. (2011). Endocannabinoid system and psychiatry: in search of neurobiological basis for detrimental and potential therapeutic effects. Frontiers in behavioral neuroscience, 5, 63. https://doi.org/10.3389fnbeh.2011.00063

Oubraim, S., Fauzan, M., Studholme, K., Gordon, C., Glaser, S.T., Shen, R.Y., Ojima, I., Kaczocha, M., Haj-Dahmane, S. (2025). Astrocytic FABP5 Mediates Retrograde Endocannabinoid Transport at Central Synapses, iScience, https://doi.org/10.1016/j.isci.2025.112342

Katona, I., and Freund, T.F. (2012). Multiple functions of endocannabinoid signaling in the brain. Annu Rev Neurosci 35, 529-558. https://doi.org/10.1146/annurev-neuro-062111-150420.

Scheyer, A., Yasmin, F., Naskar, S., and Patel, S. (2023). Endocannabinoids at the synapse and beyond: implications for neuropsychiatric disease pathophysiology and treatment. Neuropsychopharmacology 48, 37-53. https://doi.org/10.1038/s41386-022-014387.



Illustrations by Ming-Wei Chou

Stony Brook University

INTERESTED IN COMPUTATIONAL SCIENCE?

THE INSTITUTE FOR ADVANCED COMPUTATIONAL SCIENCE

iACS
INSTITUTE FOR ADVANCED COMPUTATIONAL SCIENCE

GET TO KNOW IACS!

Computational science is the use of models, simulations, and modern data analytics to solve complex problems and understand the world around us. It is an intrinsically multidisciplinary field of study.

Computational science lies at the intersection of mathematics, informatics, natural and social sciences, and is a dynamic scientific method used to explain real-world processes and a method for solving increasingly complex problems. For instance, **IACS** researchers use computers to blow up stars, scan satellite imagery for the impacts of climate change, peer into the amazing world of quantum mechanics, and explore the mysteries of songbird communication. We use the world's largest supercomputers and employ advanced AI.

IACS students advance the intellectual foundations of computation and data, with high-impact applications in engineering; in the physical, environmental, life, and social sciences; and in the humanities.

SeaWULF

OOKAMI

Join us! iacs.stonybrook.edu

Stony Brook University/SUNY is an affirmative action, equal opportunity educator and employer.

SUPPORT STONY BROOK'S WUSB RADIO

WUSB.FM/PLEDGE

RADIOTHON PACKAGES

PACKAGE 1: $90.10

INCLUDES YOUR CHOICE OF ANY **TWO** OF THE FOLLOWING ITEMS:

- DJ PICK CD
- MUG
- WATER BOTTLE
- BASEBALL CAP
- T-SHIRT
- SWEATSHIRT

PACKAGE 2: $107.30

INCLUDES YOUR CHOICE OF ANY **THREE** OF THE FOLLOWING ITEMS:

- DJ PICK CD
- MUG
- WATER BOTTLE
- BASEBALL CAP
- T-SHIRT
- SWEATSHIRT

WUSB RADIOTHON PREMIUMS

TUNE IN @ 90.1 AND 107.3FM

STREAM AND LEARN MORE AT WUSB.FM

B.R.I.D.G.ES

A Cross-Departmental Graduate Research Conference

SPRING 2026
SAC BALLROOMS & AUDITORIUM

www.sbugradmag.com/BRIDGES

Join us for our second annual B.R.I.D.G.E.S conference for a front row seat to interdisciplinary graduate works

JOIN OUR TEAM

SBU Grad Mag

Stony Brook University

We're currently looking for the following positions for the 2025-2026 Academic Year:

EXECUTIVE BOARD

- Assistant Treasurer
- Media Director
- Art Director
- Social Media Coordinator

EVENTS COMMITTEE

- Event Coordinator Lead
- Event Coordinator Member
- Event Photographer
- Event Committee Member

B.R.I.D.G.E.S COMMITTEE

- Committee Member
- Corporate & Industry Outreach Coordinator
- Speaker & Panel Coordinator

Reach out to: sbugradmag@stonybrook.edu
Check out our website: www.sbugradmag.com
Follow us on instagram: @SBU_GradMag

Apply online:

https://tinyurl.com/JoinGradMagTeam

SBU Grad Mag

www.sbugradmag.com
@sbu_gradmag