



January 11th, 2021

RE: Cover Letter for Purdue Black Trailblazers in Engineering Program
To: The Black Trailblazers in Engineering Review Committee

I am a third-year Ph.D. Candidate in the Biomedical Engineering program at the Ohio State University. Throughout my time in the program, I have closely observed and experienced the challenges resulting from a lack of minority representation and support. Most commonly, discussions of imposter syndrome arise and acknowledge the shortcomings. However, the majority of the scientific community continues to struggle to foster significant change. Ultimately, I aim to contribute to increasing diversity in STEM fields through using my future lab to train students from minority and underrepresented populations, as well as create programs intended to encourage STEM participation at younger ages. Nearing completion of my studies has led me to seek more opportunities to grow my professional skills and network. With being within 12 months of completion of my degree, I feel this is a perfect time to refine my skill base.

I have been fortunate to find an advisor (Daniel Gallego Perez) from a minority and underrepresented group that encourages and challenges me to be a leader in expanding STEM participation and inclusion. He continuously looks for growth opportunities, academically and professionally, and suggested the Black Trailblazers in Engineering (BTE) program. My interests in the BTE program come from a desire to expand my horizons by gaining exposure to varied career-oriented perspectives, networking opportunities, and learning about the plethora of science that other members of the community participate in. To foster growth and bring about meaningful changes, we must continue to encourage collaborative initiatives and learn from our leaders and rising generations. I believe the BTE program aims to achieve this type of meaningful growth, and I am excited to have the opportunity to participate and use the experiences gained to grow my lab and mentoring platforms.

As I near the completion of my doctoral studies, I envision many areas we can continue to grow and expand the ideas of diversity, equity, and inclusion within academia and the overall scientific community. The late Michael Jackson once sang 'If you want to make the world a better place, take a look at yourself, and then make a change'. Learning and growth are lifelong pursuits and we should constantly strive to improve. The Black Trailblazers in Engineering program offers an exceptional opportunity for translatable learning and growth, capable of creating meaningful changes in society. To this end, I am excited to apply for a prospective participant in Purdue's 2021 Black Trailblazers in Engineering program.

Very respectfully,

Jordan Taylor Moore, Ph.D. Candidate
Department of Biomedical Engineering
The Ohio State University



January 11th, 2021

RE: Research and Education Plan for Purdue Black Trailblazers in Engineering Program
To: The Black Trailblazers in Engineering Review Committee

My ultimate goal is to become a Principal Investigator at a multi-disciplinary research institution where I focus on developing genetic therapeutics for neurodevelopmental and neurodegenerative conditions (*e.g.*, Cerebral Palsy, Alzheimer's disease). Simultaneously, I aim to be a leader in neural engineering, promote diversity within my lab and academia, and engage the community through working with underprivileged youth. I will emerge from OSU an accomplished researcher and educator with multiple nanotechnology-based approaches to interrogate the impact of gene modulation on regeneration and repair, and an understanding of cargo (gene/molecular) transport and communication between the peripheral and central nervous systems to be leveraged for novel treatment deliveries. To achieve this goal, I am honing my ability to generate novel hypotheses, communicate my research in a clear and thought-provoking manner, and collaborate with scientists in various fields. With the guidance of my advisor, Dr. Daniel Gallego-Perez, and co-mentors, Dr. W. David Arnold and Dr. Dana McTigue, I will develop into a creative, productive, and responsible member of the academic community. Jointly, my mentors and I have constructed a comprehensive training plan that aids in identifying a postdoctoral research group and will help me achieve my career goals.

To date, my academic training has focused on applied mathematics and biomedical engineering. Within biomedical engineering, I have focused my work on combining novel non-viral nanotherapeutics with tissue engineering/reprogramming. With the abundant pathways provided through medicine and understanding the major health concerns of our nation and the world, I narrowed my focus towards neuroscience-related applications. For my dissertation research, I have chosen to focus on studying the implementation of tissue engineering in promoting peripheral nerve regeneration and restoring function. To this end, I have explored the importance of restoring the vascular network within the nerve to help address the deficits arising from nerve injury. While many aspects of my work are targeted to a particular therapeutic approach (*i.e.* vascular reprogramming) or injury model (*i.e.* nerve injury), the skills and tools I am gaining throughout my graduate research are foundational and applicable to studying many conditions. As I am nearing the end of my third year, I have completed my coursework and candidacy/qualifying exams, attended and presented at two national meetings and various local meetings, submitted fellowship applications for the NIH F31 and DSPAN F99/K00, I have written a book chapter, and submitted and published my first first-author manuscript. Additionally, I have collaborated on other research projects and been included in 5 additional manuscripts as a middle-author. Through my research, I have demonstrated an ability to lead projects and work as a member of a team to contribute to the overall success of the group.

Building off my past and current successes, I envision my future research lab to continue fostering a collaborative environment and push towards breakthroughs in precision medicine combining engineering and neuroscience. In doing such, a clear need to continue my education and stay current with the latest breakthroughs exist. I intend to expand my knowledge and understanding of micro-/nanotechnology applications as well as developmental and age-related neurodegenerative conditions. I have had the opportunity to give two guest lectures in entry-level Biomedical Engineering courses, and I have served as a Graduate Teaching Assistant in lab courses and my advisor's lecture course. These experiences have helped me grow as an

effective communicator and have offered me the chance to work on lesson plans, build quizzes, and grade coursework.

Utilizing what I have learned during my doctoral studies and teaching experiences, I envision developing a course that focuses on the designing of micro and nanoscale based approaches for treatments. The course would be intersectional as topics will range from materials science, chemical engineering, mechanical engineering, to medicine and pathology progression, and combinations of these fields will be required to properly develop and test devices or materials in potential project assignments. I believe many avenues to measure and evaluate outcomes in the course exist. Measuring baseline knowledge at the beginning of the course and performing an outgoing survey will provide a method to understand growth through the course. Additionally, assignments will include presentations that will develop skills in public speaking, literature reviewing, peer review, and identifying key information. These are all skills that are needed throughout STEM careers of all levels.

Beyond potential teaching assignments and course development, I have a strong interest in mentorship and working with youth and the community. Throughout my graduate school experience, I have been fortunate to have the opportunity to mentor undergraduates and new graduate students. I find mentoring to be a rewarding experience as I can transfer my knowledge to new lab members and learn where the gaps remain in my teachings. I have also had the opportunity to work with a non-profit in my hometown (STEMKids Champion City) and teach science to elementary and middle school students. This was a very fulfilling opportunity as these students have limited STEM exposure and many would grow to become first-generation college students. The National Science Foundation reports that African American males represent ~1.9% and ~3.1% of doctoral awardees in engineering and the biological sciences. I believe the key to increasing these numbers and changing the current narrative begins with early exposure or introduction to STEM fields and opportunities. This growth requires a community effort and will require continued nurturing through generations.

My research and education journey has truly been inspired by the amazing mentoring squad I began developing during my undergraduate career. Despite early setbacks and periods of self-doubt, my mentors have supported and guided me to where I am today. I have developed into a well-rounded scientist capable of designing, completing, and interpreting all aspects of my research. I am continuing to grow my ability to formulate compelling hypotheses to establish a leading neural engineering lab capable of advancing the scientific community and contribute therapeutic options to increase the quality of life for patients. Through the investments of my mentors and those around me, I continue to see how important giving back to the community can be. Using the talents and resources I have been granted, I am encouraged to extend opportunities to those that are underrepresented and would otherwise not have a chance to pursue their passions. My research and education plan has sustainable components for me to continue to grow as an independent researcher and to also be a contributing member of my local community.

Jordan Taylor Moore

2353 Hardesty Dr. N, Columbus, OH 43204 | (937)215-8419 | Moore.2278@osu.edu

EDUCATION

The Ohio State University	
Ph.D. Biomedical Engineering	2020-2022
M.S. Biomedical Engineering	2018-2020
B.S. Applied Mathematics	2012-2015

AWARDS

- 1st place graduate student poster (EHIRS 2020)**
- Chronic Brain Injury Travel Award (OSU CBI 2019)**
- Chronic Brain Injury Travel Award (OSU CBI 2018)**

RELATED EXPERIENCE

The Ohio State University (OSU), Columbus, Ohio	
Graduate Research Associate, Dr. Daniel Gallego-Perez Lab	08/2018 - Present
Neuroscience Scholars Program Associate	08/2020 – 05/2022
Peer Mentorship Program, Office of Graduate Education	08/2020 - 05/2021
Graduate Teaching Assistant, Dept. of Biomedical Engineering	08/2018 - 05/2019
Research Assistant 2 B/H, Dr. Daniel Gallego-Perez Lab	10/2017 - 07/2018
Research Assistant 1 B/H, Dr. Daniel Gallego-Perez Lab	12/2016 - 10/2017

The Ohio State University (OSU), Columbus, Ohio

Graduate Research Associate, Dr. Daniel Gallego-Perez Lab 08/2018 - Present

- Designed and performed experiments applying nanoscale tissue nano-transfection to nerve injury/repair applications and other neurodegenerative conditions
- Performed cell culture experiments to investigate cellular reprogramming capabilities
- Worked with my advisor to perform peer-review of manuscripts for journals
- Performed literature reviews and helped write grants for DoD and NIH applications

The Ohio State University (OSU), Columbus, Ohio

Peer Mentorship Program, Office of Graduate Education 08/2020 - 05/2021

- Assisted incoming graduate students in transitioning to graduate school and the new environment
- Mentored two first-year Ph.D. students: one biomedical engineering and one materials science engineering student

The Ohio State University (OSU), Columbus, Ohio

Graduate Teaching Assistant, Dept. of Biomedical Engineering 08/2018 - 05/2019

- Guided students through introductory labs of biomechanics, cell/tissue engineering, and imaging
- Performed demonstrations in a cleanroom facility for photolithography
- Created quiz questions over lecture material
- Created rubrics and graded assignments

The Ohio State University (OSU), Columbus, Ohio

Research Assistant, Laboratory Manager, Dr. Daniel Gallego-Perez Lab 12/2016 - 12/2018

- Performed *in vivo* transfections and assisted with tissue collection of rodents
- Performed immunohistochemistry (ICC, IF, DAB)
- Performed RNA and DNA isolation, cDNA synthesis, and qRT-PCR
- Assisted with electrophysiology measurements of rodents
- Worked with adherent cell cultures

The Ohio State University (OSU), Columbus, Ohio

Volunteer Research Assistant, Dr. Daniel Gallego-Perez Lab

11/2015 - 12/2016

Major Topics:

- Non-Viral Gene Delivery to Peripheral Nerve through a Nanostructured Chip Platform

The Ohio State University (OSU), Columbus, Ohio

Research Assistant 1 B/H, Laboratory Manager, Laser-Capture Molecular (LCM) Core Lab 05/2015 – 12/2016

- Managed the Laser Capture Molecular Core facility that currently houses two state-of-the-art laser capture microdissection instruments
- Managed and coordinated facility operational budgets and fiscal forecasting – analyzed and reconciled financial reports
- Presented facility growth, financial activities and fiscal projection in the monthly advisory meetings
- Managed one staff, multiple students, and supervised facility users
- Involved in hiring, coaching and mentoring staffs
- Coordinated research projects with several principal investigators (PIs) within OSU
- Implemented a new inventory management system

PROFICIENT LABORATORY SKILLS

- Mammalian cell culture: established and primary cell lines.
- Protein: immunohistochemistry, immunocytochemistry.
- RNA: isolation from tissue and cells/exosomes, cDNA preparation, qPCR analysis.
- DNA: PCR
- Microscopy: wide-field and confocal fluorescent, bright-field imaging, laser capture microdissection, SEM, and TEM.
- Muscle physiology: compound muscle action potential (CMAP), muscle force.

PUBLICATIONS

J. Moore, C. Wier, L. Lemmerman, L. Ortega-Pineda, D. Dodd, W. Lawrence, et al.

“Nanochannel-Based Poration Drives Benign and Effective Nonviral Gene Delivery to Peripheral Nerve Tissue”. *Advanced Biosystems* (2020, paper)

V. Shukla, S. Duarte-Sanmiguel, A. Panic, A. Senthilvelan, J. Moore, C. Bobba, et al.

“Reciprocal Signaling between Myeloid Derived Suppressor and Tumor Cells Enhances Cellular Motility and is Mediated by Structural Cues in the Microenvironment”. *Advanced Biosystems* (2020, paper)

L. Diaz-Starokozheva, D. Das, X. Gu, J. Moore, L. Lemmerman, I. Valerio, et al. *“Early Intervention in Ischemic Tissue with Oxygen Nanocarriers Enables Successful Implementation of Restorative Cell Therapies”*. *Cellular and Molecular Bioengineering* (2020, paper)

S. Duarte-Sanmiguel, V. Shukla, B. Benner, J. Moore, L. Lemmerman, W. Lawrence, et al.

“Guided migration analyses at the single-clone level uncover cellular targets of interest in tumor-associated myeloid-derived suppressor cell populations”. *Scientific Reports* (2020, paper)

J. Moore, D. Alzate-Correa, D. Dasgupta, W. Lawrence, D. Dodd, C. Mathews, et al.

“Nanoengineered exosomes drive targeted delivery of reprogramming genes to nerve tissue”. *Nanotechnology and Microfluidics* Published online December 27, 2019 (chapter)

N. Higueta-Castro, L. Lemmerman, A. Sunyecz, S. Duarte-Sanmiguel, ..., J. Moore, ..., et al.

“Nanoengineered exosomes drive targeted delivery of reprogramming genes to nerve tissue”. *Society for Neuroscience, Chicago, Illinois, USA October 19-23 2019 (abstract)*

J. Moore, N. Higueta-Castro, C. Wier, S. Kolb, I. Valerio, D. Gallego-Perez. *“Tissue nano-transfection drives localized delivery of therapeutics to the peripheral or central nervous system in a minimally invasive manner”*. *Society for Neuroscience, Chicago, Illinois, USA*

October 19-23 2019 (abstract)

J. Moore, N. Higueta-Castro, C. Wier, D. Gallego-Perez. "In vivo non-viral delivery of gene and cell therapies to peripheral and central nervous system". Society for Neuroscience, San Diego, California, USA November 3-7 2018 (abstract)

D. Gallego-Perez, D. Pal, S. Ghatak, V. Malkoc, N. Higueta-Castro, ..., **J. Moore**, ..., et al. "**Topical tissue nano- transfection mediates non-viral stroma reprogramming and rescue**" Nat. Nanotechnol. (2017), [10.1038/nnano.2017.134](https://doi.org/10.1038/nnano.2017.134) Published online August 7, 2017 (paper)

CONFERENCES AND PRESENTATIONS

J. Moore, N. Higueta-Castro, C. Wier, S. Kolb, I. Valerio, D. Gallego-Perez. "Tissue nano-transfection promotes localized delivery of therapeutics to the peripheral and/or central nervous system via minimally invasive methods". Podium Presentation at the 5th Annual Engineering in Healthcare: Industry and Research Symposium, Columbus, Ohio, USA February 14, 2020

J. Moore, N. Higueta-Castro, C. Wier, S. Kolb, I. Valerio, D. Gallego-Perez. "Tissue nano-transfection promotes localized delivery of therapeutics to the peripheral and/or central nervous system via minimally invasive methods". Tissue Engineering Regenerative Medicine International Society, Orlando, Florida, USA December 2-5 2019

J. Moore, Natalia Higueta-Castro, Maria Balch, Hallie N. Harris, William Lawrence, Richard Stewart, Alec Sunyecz, Chandan K. Sen, Savita Khanna, Cameron Rink, Daniel Gallego-Perez. "Nano-reprogrammed Cell Intervention Targets Brain Injury Recovery". Podium Presentation at 13th Annual Davis Heart and Lung Research Day, Columbus (OH), USA, March 2018

N. Higueta-Castro, C. Wier, **J. Moore**, A. Sunyecz, C. Sen, J. Otero, S. Kolb, D. Gallego-Perez. "Novel Non-Viral Approaches for Gene Delivery to Peripheral Nerves". Poster Presentation at Target Nucleic Acid Detection & Delivery, South Bend (IN), USA, July 2018

N. Higueta-Castro, C. Wier, **J. Moore**, A. Sunyecz, C. Sen, J. Otero, S. Kolb, D. Gallego-Perez. "Novel Non-Viral Approaches for Gene Delivery to Peripheral Nerves". Podium Presentation at 3rd Annual Engineering in Healthcare: Industry and Research Symposium, Columbus (OH), USA, March 2018

N. Higueta-Castro, C. Wier, **J. Moore**, A. Sunyecz, C. Sen, J. Otero, S. Kolb, D. Gallego-Perez. "Non-Viral Gene Delivery to Peripheral Nerve through a Nanostructured Chip Platform". Poster Presented at Biomedical Engineering Society Meeting, Minneapolis (MN), USA, October 2016.



Wexner Medical Center

**The Ohio State University
Department of Neurology
Division of Neuromuscular
Medicine
395 West 12th Avenue, 7th Floor
Columbus, Ohio 43210-1228**

Re: Jordan Moore's application to the Black Trailblazers in Engineering Program

January 19, 2021

Dear Review Committee,

It is a great pleasure to write this letter of support for Jordan's application to the Black Trailblazers in Engineering program. I enthusiastically and whole-heartedly support his career as a scientist, and I am excited to see what he does during his career. I believe this program would be an excellent opportunity for him to further boost his career trajectory by forming meaningful connections with other scientist and potential mentors in the field. Jordan is nearing completion of his graduate studies, and now is an ideal time for him to attend this virtual workshop.

I am an associate professor in the Departments of Neurology, Physical Medicine and Rehabilitation, Physiology and Cell Biology, and Neuroscience at the Ohio State Wexner Medicine Center. The overall focus of my lab program is on translational neuromuscular physiology with a particular emphasis on mechanisms and treatments of loss of physical function in genetic and acquired neuromuscular disorder and in aging.

I have worked with Jordan for the last 4 years as he has progressed in his career development through stages as a research assistant, research assistant-lab manager, and now as a productive graduate student. We have collaborated on a number of completed and ongoing projects within Dr. Gallego-Perez's lab and my lab. Our ongoing collaborations are leveraging novel bioengineering technologies and approaches with novel molecular mechanisms to develop therapeutics for traumatic peripheral nerve injuries. Jordan is intelligent, organized, and thoughtful, and he has developed strong collaborations with my lab team. He is a leader. I have directly observed him display impressive perseverance during challenging points in his career and projects. I began working with him early in his career and have observed his continuous growth as an individual and scientist.

I enthusiastically support Jordan's proposal and him as a scientist. He is dedicated to pursuing an academic career as a scientist, and I am excited to see what he achieves during his career.

Please don't hesitate to contact me with any other questions that you might have.

Sincerely,

W. David Arnold, MD
Associate Professor



Jan 17th, 2021

Re: Support Letter for **Mr. Jordan Moore**

To whom it may concern:

I am delighted to write this letter of recommendation in strong support of **Mr. Jordan Moore** as a candidate for the 2021 Black Trailblazers in Engineering workshop. By way of introduction, I am an Assistant Professor in the Departments of Biomedical Engineering and Surgery at OSU. This dual appointment allows for unhindered access to a variety of resources and scientists from diverse backgrounds, which will be essential in providing Jordan with comprehensive and interdisciplinary scientific training and preparation for a career in academia. Jordan has worked closely with me since 2016, when he first joined my lab as a Research Assistant (RA) and contributed to the development of a platform nanotechnology for Tissue Nano-Transfection, focused on skin applications. I found Jordan to be a very independent researcher with excellent technical skills, work ethic, and a strong passion for learning new things and challenging scientific paradigms.

After two years in my lab as a RA, I recruited Jordan as a Ph.D. student in the Department of Biomedical Engineering, to have him focus on further developing the TNT technology for applications that go beyond skin. Jordan's passion for neuroscience, and his continued interest in finding engineering solutions for debilitating conditions such as traumatic injuries, suffered by both the civilian and military populations, led him to steer this project into peripheral nerve tissue. Jordan's goal is to develop a TNT-based platform technology, to genetically manipulate injured nerve tissue for therapeutic applications. This research, in addition to having invaluable translational potential, will be key to better understanding the mechanisms underlying inherent cellular plasticity within the context of injury and tissue repair and regeneration. Jordan's work has led him to submit and present research findings at leading conferences (e.g., Society for Neuroscience -SFN-, Tissue Engineering and



Regenerative Medicine International Society -TERMIS-, Biomedical Engineering Society Meeting -BMES-), and generated a first-author manuscript recently published in *Advanced Biosystems*.

In addition to developing as a scientist, Jordan has expressed a sincere interest to become a faculty member and use the platform to work towards increasing minority involvement in STEM. Jordan has worked as a Teaching Assistant (TA) for one year during his studies. During this time, he has helped introduce students to the various domains of biomedical engineering (*e.g.*, tissue engineering, mechanobiology, micro/nanofabrication). Furthermore, Jordan has spent time as a TA with me in the classroom and gained experience lecturing, creating rubrics/grading, and preparing quizzes. Jordan has shown his commitment to encouraging diversity as he previously used his weekends to volunteer with STEM Kids Champion City to spark an interest in science and technology in the youth. In recognizing the disparity in minority representation within a large university, Jordan has started drafting plans for creating a community outreach program within our department to encourage the idea of pursuing STEM careers in middle and high-school students. Jordan has recently become the president of our department's Graduate Student Association and intends to use the opportunity to continue to advance these efforts.

I believe Jordan's experience and commitment have placed him on a trajectory for becoming a very promising young scientist capable of performing top-quality research. His commitment towards increasing diversity will allow Jordan to make use of his platform to mentor trainees within the lab, but also reach out into the community and show a firsthand example of what can be achieved. Accordingly, I believe Jordan is an excellent candidate for Black Trailblazers in Engineering. Please do not hesitate to contact me should you need any further information.

Sincerely,

Daniel Gallego-Perez, PhD
Department of Biomedical Engineering
Department of Surgery
The Ohio State University