Expectations Document for Graduate Students in the Hinton Laboratory

Overview

The following document outlines the expectations for graduate, or equivalent, level students (herein “graduate students”) within the Hinton Laboratory. *Graduate students include but are not limited to those currently pursuing a Doctor of Philosophy (PhD), Medical Degree (MD), or equivalent graduate/professional degree*. These expectations are designed to ensure that the lab operates efficiently, maintains high standards of research and mentorship, and fosters a collaborative and inclusive environment.

Please see the Hinton Laboratory’s mentor contract[[1]](#footnote-1), which provides an overview of expectations for everyone in the lab (including Dr. Hinton) in a productive mentee-mentor relationship. Additionally, “[expectations of you](https://lab.vanderbilt.edu/hinton-lab/teaching-philosophy/my-expectations-of-you/)” and “[expectations of me](https://lab.vanderbilt.edu/hinton-lab/teaching-philosophy/expectations-of-me/)” provide a general overview of the mutualistic relationship within the laboratory. This Expectations Document serves to provide a specific guideline of expectations for those who are graduate students. These standards are in place to ensure that graduate students of the Hinton laboratory excel; hence, these are not only high standards that graduate students are held to, but also high standards that they can expect to attain.

Broadly, the Hinton lab requires graduate students to be committed to being mentored using innovative mentoring tools, such as self-assessment tools (e.g., implicit bias training, personality test, learning styles, and love language test), mentoring maps, individual development training plan, career development activities, and cultural competence training. Previous publications which focus explicitly on unique aspects of the Hinton Laboratory should be read[[2]](#footnote-2),[[3]](#footnote-3). Additionally, the Hinton lab expects that graduate students have enthusiasm for working with a diverse student population, and welcome applicants who are interested in building their own skills in mentoring through engaging and training undergraduate students. Please read the entirety of this document carefully to review expectations and any questions should promptly be directed to senior faculty members.

A multifaceted approach of research, career development, professional development, and mentorship

Research

Graduate students will work with the PI to understand the direction of their project. As a fledgling researcher, graduate students are expected to work with the PI and co-mentors to understand and develop their research projects. If possible, graduate students are also encouraged to collaborate within the department as well as with the broader mitochondria and organelle-to-organelle contact community. Graduate students must be receptive to learning how to properly document experiments in a lab notebook and present experiments in writing and orally. Graduate students will also be responsible for helping to maintain regular laboratory and equipment upkeep. Graduate students are expected to, at minimum, present at one conference (or comparable event) every two years to maintain updates on their research. Additionally, a regular research output is expected (See Research and Publication Requirements).

Career Development

Graduate students are also expected to participate in collaborative networking opportunities (e.g., AAAS Mass Media Science & Engineering Fellows Program, NSF Graduate Research Fellowship Program (GRFP), National Institutes of Health (NIH) Graduate Partnerships Program (GPP), and MIT Media Lab's Graduate Program in Media Arts and Sciences.). Graduate students are also expected to apply to participate in writing programs (e.g., Writing in the Disciplines (WID) Graduate Writing Fellows Program, Council of Graduate Schools (CGS) Dissertation Writing Retreats, Purdue Online Writing Lab (OWL) Graduate Writing Workshops, Yale Poorvu Center for Teaching and Learning Writing Retreats). Career development can further include seminars and courses on how to make collaborations, avoid unnecessary conflict, and find solutions that are mutually beneficial for everyone involved.

Graduate students will additionally be expected to undergo leadership development to improve their roles as future mentors, PIs, or other STEMM positions. Leadership training should be accomplished through relevant workshops, seminars, and readings and through collaboration with STEMM students who are at an earlier phase of their careers. While lab members’ primary goal is to complete the research required, graduate students should communicate this data in an organized, comprehensive, and understandable way that makes members stand out as an academics. To this end, career development opportunities should teach graduate students on how to write and give a good presentation.

Professional Development

Graduate students are expected to seek opportunities so they can grow as an individual and better prepare for their professional careers. Graduate students are expected to, under the guidance of the PI, build a trademark in a way that will promote their career development. This includes writing independent fellowships/grants (e.g., HHMI Gilliam, Hertz Foundation Graduate Fellowship, NIH F31 Ruth L. Kirschstein Predoctoral Individual National Research Service Award, Ford Foundation Predoctoral Fellowship) and engaging in the opportunities necessary for professional development. Writing primary manuscripts and literature reviews is similarly expected.

Graduate students are required to maintain training and seek out relevant training opportunities. Professional development should include seminars and trainings to run a supportive, equitable, accessible, inclusive, lab that encourages and is respectful of people from different backgrounds and walks of life.

Service and Mentorship

Graduate students will be expected to give back to the community in a positive and meaningful way throughout their tenure in the lab (and hopefully beyond). This includes community service, participation in community-led initiatives, and other beneficial events for the community. This also includes actively improving mentorship through participation in the Center for the Improvement of Mentored Experiences, culturally aware mentorship, and National Mentoring Research Network-hosted training. Regular conversations with senior laboratory members should be had to further improve mentoring skills.

Daily Responsibilities

Work Hours:

Graduate students are expected to adhere to a rigorous work schedule to meet research and mentorship obligations. The laboratory operates on a standard workweek, and additional hours may be necessary to fulfill project requirements and publication goals. Research hours start at 9:30 a.m. and end around 5 p.m. every day. Graduate students are expected to complete data analysis in the laboratory and be present every day. Additionally, for time-sensitive deadlines, postdoctoral members may also be expected to meet in the evenings by Zoom and during writing accountability group[[4]](#footnote-4) sessions from around 7:30 pm to 10:00 pm. Adherence to these work hours may be modified only upon discussion with the PI and with PI approval.

Lab Meetings:

Regular attendance at weekly lab meetings is mandatory. These meetings are crucial for discussing ongoing research, sharing progress updates, and fostering collaborative efforts within the team. Additionally, if given the opportunity, graduate students are expected to set up and attend lab meetings outside of the Hinton Laboratory. Graduate students are expected to coordinate input from multiple mentors and research team members by receiving, reflecting on, and applying constructive feedback, and ensuring follow-up by both mentors and scholars. Graduate students should be ready to work with people from different research groups in different labs, departments, and institutions to maximize the impact of all work published by the Hinton Laboratory. In developing collaborations, memorandums of understanding should be utilized as applicable [[5]](#footnote-5).

Project Involvement

Graduate students must actively participate in the laboratory's research projects, contributing their expertise and guiding postdoctoral researchers and students. Graduate students must keep a diligent record of their experiments in a notebook, which should be written in a way that an experiment can be repeated at a later time (e.g., ten years later). Every experiment should be reproducible, and notebooks should be a testament to this reproducibility. Notes, records, and research data are property of the Hinton Laboratory. When graduate students leave the lab, they are welcome to make copies of notebooks, but the original must stay in the lab indefinitely for the lab’s future reference.

The specific projects worked on should be documented and regularly updated in the laboratory’s project management system. All experiments, data, findings, and insights for future research areas generated within the Hinton Laboratory are property of the Hinton Laboratory, unless otherwise dictated.

Additional Responsibilities

Graduate students should ensure that their professional profiles, research updates, and publication lists are kept current on the Hinton Laboratory’s website. Graduate students should, if they desire, maintain an active and professional presence on social media[[6]](#footnote-6). This transparency helps in showcasing the laboratory’s work and attracting potential collaborators and students.

Additional duties, not listed herein, may be assigned and their completion is expected, nonetheless.

Maintaining Literature

In addition to regular research activities, a significant amount of time should be devoted to staying up-to-date on the mitochondrial, 3D imaging, and endocrine fields, in addition to any fields specific to ones’ project. The mitochondrial field is constantly advancing, and a graduate student’s knowledge of the literature is both essential to pose relevant scientific questions as well as representing the laboratory strongly at conferences. Without a fundamental understanding of what needs to be done in the field, the current controversies, as well as the leading techniques and scientists within the field, effective science cannot be done. Below is a list of recent publications from the Hinton Laboratory, as well as select mitochondrial researchers. Note that this is not a comprehensive list and graduate students should continuously expand their literature search. Simply reading manuscripts just once is not enough; graduate students should regularly review these and other publications to maintain a strong knowledge base:

**Mitochondria and their structure:**

Mitochondria in Disease Jenkins, B. C., Neikirk, K., Katti, P., Claypool, S. M., Kirabo, A., McReynolds, M. R., & Hinton, A., Jr (2024). Mitochondria in disease: changes in shapes and dynamics. Trends in biochemical sciences, 49(4), 346–360. <https://doi.org/10.1016/j.tibs.2024.01.011>

Mitochondrial Structure:

<https://www.frontiersin.org/articles/10.3389/fphys.2020.541040/full>

Cristae:

<https://www.sciencedirect.com/science/article/pii/S0968000416000025>

The MICOS complex:

<https://link.springer.com/article/10.1007/s00441-016-2433-7>

MERCS:

<https://www.nature.com/articles/cdd201652>

**Methodologies:**

Please read the TEM mitochondria protocol. You will use this one to quantify TEM (mitochondria, cristae, and MERCs)

A Universal Approach to Analyzing Transmission Electron Microscopy with ImageJ - PubMed ([nih.gov](http://nih.gov/))

<https://pubmed.ncbi.nlm.nih.gov/34571826/>

Please read the TEM recycling protocol. You will use this one to quantify TEM (lysosomes, autophagosomes, autolysosomes, and lipid droplets)

Systematic Transmission Electron Microscopy-Based Identification and 3D Reconstruction of Cellular Degradation Machinery - PubMed ([nih.gov](http://nih.gov/))

<https://pubmed.ncbi.nlm.nih.gov/36869426/>

How and why we fix our samples to make the TEM and 3DEM we do:

A Comprehensive Approach to Sample Preparation for Electron Microscopy and the Assessment of Mitochondrial Morphology in Tissue and Cultured Cells - PubMed ([nih.gov](http://nih.gov/))

<https://pubmed.ncbi.nlm.nih.gov/37140138/>

Considerations for measurement:

Neikirk, K., Lopez, E. G., Marshall, A. G., Alghanem, A., Krystofiak, E., Kula, B., Smith, N., Shao, J., Katti, P., & Hinton, A., Jr (2023). Call to action to properly utilize electron microscopy to measure organelles to monitor disease. *European journal of cell biology*, *102*(4), 151365. <https://doi.org/10.1016/j.ejcb.2023.151365>

Brief overview of what FIB-SEM is:

<https://pubmed.ncbi.nlm.nih.gov/36990957/>

Overview of what SBF-SEM is:

<https://pubmed.ncbi.nlm.nih.gov/37246236/>

Live imaging:

<https://journals.biologists.com/jcs/article-abstract/136/3/jcs260370/286985>

Considerations for MitoTracker:

Neikirk, K., Marshall, A. G., Kula, B., Smith, N., LeBlanc, S., & Hinton, A., Jr (2023). MitoTracker: A useful tool in need of better alternatives. European journal of cell biology, 102(4), 151371. <https://doi.org/10.1016/j.ejcb.2023.151371>

Lastly, this is a protocol on how to measure 3DEM by hand without using Python.

Protocols for Generating Surfaces and Measuring 3D Organelle Morphology Using Amira - PubMed ([nih.gov](http://nih.gov/))

<https://pubmed.ncbi.nlm.nih.gov/35011629/>

**Recent Research:**

Using these above methods, the Hinton laboratory published several research manuscripts, so it is important to be familiar how these methods have previously been used:

Please read this manuscript regarding how 3D BAT mitochondrial structure changes; also, this manuscript defines a method to quantify cristae score in 3D.:

<https://pubmed.ncbi.nlm.nih.gov/37607124/>

Please read this manuscript regarding how 3D cardiac structure changes with aging; showing an association of the MICOS complex, which we are currently investigating as a molecular target:

 <https://pubmed.ncbi.nlm.nih.gov/37624101/>

We’ve also recently had a manuscript, which shows how the tissue-dependent changes in mitochondria may be linked to the MICOS complex and changes in metabolism.

Vue, Z., Garza-Lopez, E., Neikirk, K., Katti, P., Vang, L., Beasley, H., Shao, J., Marshall, A. G., Crabtree, A., Murphy, A. C., Jenkins, B. C., Prasad, P., Evans, C., Taylor, B., Mungai, M., Killion, M., Stephens, D., Christensen, T. A., Lam, J., Rodriguez, B., … Hinton, A., Jr (2023). 3D reconstruction of murine mitochondria reveals changes in structure during aging linked to the MICOS complex. Aging cell, 22(12), e14009. <https://doi.org/10.1111/acel.14009>

Revision for Circulation Research (Heart Failure Story)- Vue, Z., Ajayi, P. T., Neikirk, K., Murphy, A. C., Prasad, P., Jenkins, B. C., Vang, L., Garza-Lopez, E., Mungai, M., Marshall, A. G., Beasley, H. K., Killion, M., Parker, R., Anukodem, J., Lavine, K., Ajijola, O., Mobley, B. C., Dai, D. F., Exil, V., Kirabo, A., … Hinton, A., Jr (2023). Human Heart Failure Alters Mitochondria and Fiber 3D Structure Triggering Metabolic Shifts. *bioRxiv : the preprint server for biology*, 2023.11.28.569095. [https://doi.org/10.1101/2023.11.28.569095](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1101%2F2023.11.28.569095__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ9pmY2xlI%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749910942%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=iRJtCm6uB6Q45S0f6G9zTS1YKH83mJ9D1638x4IcJSQ%3D&reserved=0)

Revision for Aging Cell (MFN-2 story)- Scudese, E., Vue, Z., Katti, P., Marshall, A., Vang, L., Garza López, E., Neikirk, K., Stephens, D., Hall, D. D., Rostami, R., Shao, J. Q., Mungai, M., AshShareef, S. T., Hicsasmaz, I., Manus, S., Wanjalla, C., Whiteside, A., Williams, C., Damo, S. M., Gaddy, J. A., … Hinton, A. (2023). 3D Mitochondrial Structure in Aging Human Skeletal Muscle: Insights into MFN-2 Mediated Changes. *bioRxiv : the preprint server for biology*, 2023.11.13.566502. [https://doi.org/10.1101/2023.11.13.566502](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1101%2F2023.11.13.566502__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ9bhAnDVU%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749918187%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=o0C%2BmbI4er%2BxEwf4fo9028%2BXuyNorQbB8HJNrqjIPQw%3D&reserved=0)

Please read papers from leaders within the field:

Brian Glancy - Mitochondria Structure Leader

Glancy, B., Hartnell, L. M., Malide, D., Yu, Z. X., Combs, C. A., Connelly, P. S., Subramaniam, S., & Balaban, R. S. (2015). Mitochondrial reticulum for cellular energy distribution in muscle. *Nature*, *523*(7562), 617–620. [https://doi.org/10.1038/nature14614](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1038%2Fnature14614__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ96bNqog4%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749332455%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=ZQDgK%2Fkeg72BJVbPBNuaiKNwyr68KDmRxTSrAv9hCUo%3D&reserved=0)

Katti, P., Ajayi, P. T., Aponte, A., Bleck, C. K. E., & Glancy, B. (2022). Identification of evolutionarily conserved regulators of muscle mitochondrial network organization. *Nature communications*, *13*(1), 6622. [https://doi.org/10.1038/s41467-022-34445-9](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1038%2Fs41467-022-34445-9__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ98km1aKw%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749339780%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=SppBt4DRaBXmUatNfPmPs6nBvUyp5suBGOY0R7vysNQ%3D&reserved=0)

Willingham, T. B., Kim, Y., Lindberg, E., Bleck, C. K. E., & Glancy, B. (2020). The unified myofibrillar matrix for force generation in muscle. *Nature communications*, *11*(1), 3722. [https://doi.org/10.1038/s41467-020-17579-6](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1038%2Fs41467-020-17579-6__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ9A2HgzRE%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749347020%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=GYBghq%2BgwgyVaMIQzaotXZfE1rwS9hpD8RhfsGmXHt8%3D&reserved=0)

Bleck, C. K. E., Kim, Y., Willingham, T. B., & Glancy, B. (2018). Subcellular connectomic analyses of energy networks in striated muscle. *Nature communications*, *9*(1), 5111. [https://doi.org/10.1038/s41467-018-07676-y](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1038%2Fs41467-018-07676-y__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ9HOReXDw%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749354192%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=60ePh1KADjw9%2FedEEexiy4zR5%2B%2F466z4LS0Ke3g1RwU%3D&reserved=0)

Katti, P., Hall, A. S., Parry, H. A., Ajayi, P. T., Kim, Y., Willingham, T. B., Bleck, C. K. E., Wen, H., & Glancy, B. (2022). Mitochondrial network configuration influences sarcomere and myosin filament structure in striated muscles. *Nature communications*, *13*(1), 6058. [https://doi.org/10.1038/s41467-022-33678-y](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1038%2Fs41467-022-33678-y__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ9qGfaesE%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749361395%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=3%2FVnOPhXh0aZlUI6fop3lis7bD7ZyQ4lHj7%2F5zjw6OA%3D&reserved=0)

Ajayi, P. T., Katti, P., Zhang, Y., Willingham, T. B., Sun, Y., Bleck, C. K. E., & Glancy, B. (2022). Regulation of the evolutionarily conserved muscle myofibrillar matrix by cell type dependent and independent mechanisms.*Nature communications*, *13*(1), 2661. [https://doi.org/10.1038/s41467-022-30401-9](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Furldefense.com%2Fv3%2F__https%3A%2F%2Fdoi.org%2F10.1038%2Fs41467-022-30401-9__%3B!!OToaGQ!s1QtxD50aMi_PsfcNYu48HEj2yZPbtqNgirIpsBDwFTAMZF7lauPuKgCOqaFUTHYLEt7WEQpIGI7knthqCPy7apr-JGLGvZ9kYTb0ik%24&data=05%7C02%7Ckit.neikirk%40Vanderbilt.Edu%7C554577ad487f41ca9e0608dc78ad7dc6%7Cba5a7f39e3be4ab3b45067fa80faecad%7C0%7C0%7C638517933749368599%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=dnawLSRe90kMA%2FtVQ%2BwqNAdVsX1yR8LkaRTr%2BJrPn3c%3D&reserved=0)

Martin Picard

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**Diversity, equity, and inclusion (DEI) in the Hinton Laboratory**

While research is at the center of the Hinton Laboratory, it also recognizes the importance of DEI in advancing science, and Dr. Hinton is active in the DEI field. Briefly, the operative methods used in any teaching philosophy employ student learning and practical instruction. While this is true for the Hinton lab, our teaching philosophy has grown and transitioned from the “typical” model of presenting students with basic facts and developing an assessment that measures their retention. The Hinton Laboratory views traditional teaching methods as counterintuitive to deeper understanding, which emphasizes a Socratic teaching style that embraces constructivist principles and metacognition for greater student accountability. Instead, the Hinton Laboratory’s primary goal in teaching is to avoid rote memorization by students in teaching and fostering an attitude of critical analysis. Please read more completely about the mentoring philosophy of the laboratory here: <https://lab.vanderbilt.edu/hinton-lab/teaching-philosophy/>

Much of this mentoring philosophy includes intentional mentoring, which is individualized and effective. Please read more about intentional mentoring and minority-specific mentoring here:

Intentional mentoring: maximizing the impact of underrepresented future scientists in the 21st century - <https://pubmed.ncbi.nlm.nih.gov/34283236/>

Mentoring minority trainees: Minorities in academia face specific challenges that mentors should address to instill confidence - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7534611/>

Of note, the Hinton Laboratory prioritizes wellness and health. As a part of the Hinton Laboratory, graduate students will be connected with additional resources, and the Hinton Laboratory encourages all graduate students seek help concerning all mental health issues, should any arise. Mental health also extends to burnout, which can be further be read about here:

Toxic stress and burnout: John Henryism and social dominance in the laboratory and STEM workforce - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8435059/>

The Hinton Laboratory responds to microaggressions through the microaggression meter [[7]](#footnote-7). Graduate students who see or feel microaggression should not be afraid to report them. Read this manuscript to better understand microaggressions:

Responding and navigating racialized microaggressions in STEM - <https://pubmed.ncbi.nlm.nih.gov/34048540/>

Graduate students should keep up to date on literature within the STEMM education and DEI field to maintain strong knowledge and keep abreast of ways of being an effective mentor.

Research and Publication Requirements

First-Author Research Publications:

Graduate students are required to publish at least one (1) first-author/co-first-author research paper every 2-5 years in peer-reviewed scientific journals. These publications should reflect the high-quality research conducted within the Hinton Laboratory and contribute significantly to the respective field. This research publication requirement can be reduced only through explicit approval from the PI, such as in the case of working on a broader-scope project (*Cell, Nature, Science*).

Graduate students should draw on resources at the Hinton Laboratory, including undergraduates and collaborators, to aid in collecting data and writing manuscripts; science is not a solitary act, so graduate students will need to make use of all available resources to publish this amount. Before submitting any research manuscript, first-authors are responsible for ensuring all authors are listed, funding is correct, and their approval has been obtained from a statement of release [[8]](#footnote-8).

First-Author Review Articles:

Graduate students must also publish at least one (1) review article every 2-5 years, ideally as a co-first author. These reviews should provide comprehensive insights into specific research areas, highlight recent advancements, and propose future research directions. While these can be written in conjunction with other laboratories, they can also be written within the Hinton Laboratory.

Co-Author Contributions:

Graduate students must also publish at least one (1) co-author contribution every 2-5 years, ideally with one as a co-first author, with others outside of the Hinton Laboratory. These co-author manuscripts should represent manuscripts led or partially led by a team outside of the Hinton laboratory (and do not include regular co-author publications within the laboratory). These co-author publications must represent out-of-lab collaboration, which is a vital part of innovative science. This will also underscore the ability of graduate students to cultivate translatable skills which increase their desirability to other laboratories.

Beyond these, regular co-author publications within the laboratory are expected. These should reflect a constant collaborative spirit with prioritization and aiding to mutualistically help everyone in the laboratory reaches their publication goals.

DEI and Mentoring:

Annually, graduate students have the option to contribute as co-authors to at least one (1) DEI, mentoring-related, or STEMM education manuscript. This contribution underscores the laboratory's commitment to fostering an inclusive environment and supporting the development of diverse talent in STEM. Thus, active participation in STEMM education initiatives and mentoring programs is required. The Hinton laboratory respects all views on how to promote inclusivity, so graduate students are welcomed to contribute to existing commentaries, lead their own commentaries, or work on general STEMM education projects, in the case of any of these, connections may be made with institutes such as Peabody College.

Evaluation and Renewal

Annual Renewal

Graduate students within the Hinton Laboratory have annual reviews. The review process involves a comprehensive evaluation of the graduate students’ performance in research, publication, mentorship, and DEI contributions. The evaluation also includes a review of the individual development plan (IDP)[[9]](#footnote-9), and updating the IDP to reflect more up-to-date goals. The goals and expectations listed here are broad and are likely to be expanded upon and specified in the IDP, but these expectations represent a fundamental standard that all graduate students will be held to.

Grounds for Dismissal

Failure to meet the outlined expectations, including publication requirements, attendance at lab meetings, active project participation, or repetitive disagreements within the laboratory (such as measured through the Microaggression Meter[[10]](#footnote-10)) may result in delaying of graduation.

Bottom of Form

Agreement:

Adhering to these expectations is crucial for maintaining the high standards of the Hinton Laboratory. Graduate students are encouraged to strive for excellence in their research, mentorship, and contributions to the scientific community. The end goal is to foster a supportive and inclusive laboratory environment. By signing below, the laboratory member agrees to the terms of this contract, and will mutually uphold all aspects of the document that are stated above. Additionally, signing this expectations document represents a mutual agreement that progress will be reviewed regularly and evaluated, as well as agreement to the stated goals, action plan, and timeline laid out in this document and in any IDPs.

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Signature

Graduate student at Vanderbilt University in Antentor Hinton Laboratory.

Signature

Antentor Othrell Hinton, Jr., Ph.D.

Chan Zuckerberg Initiative Science Diversity Leadership Investigator

Ernest E. Just Early Career Investigator

Assistant Professor, Department of Molecular Physiology and Biophysics

1. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/05/Mentoring-Contract.docx> [↑](#footnote-ref-1)
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5. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/05/MOU-Form-Fillable.docx> [↑](#footnote-ref-5)
6. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/05/Hinton-Laboratory-Social-Media-Policy.docx> [↑](#footnote-ref-6)
7. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/06/Microaggression-meter1.docx> [↑](#footnote-ref-7)
8. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/05/Statement-of-release-for-Manuscripts.docx> [↑](#footnote-ref-8)
9. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/06/IDP1.docx> [↑](#footnote-ref-9)
10. <http://lab.vanderbilt.edu/hinton-lab/wp-content/uploads/sites/150/2024/06/Microaggression-meter1.docx> [↑](#footnote-ref-10)