BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Austin Minton

eRA COMMONS USER NAME (credential, e.g., agency login): AUSTIN.MINTON

POSITION TITLE: Graduate Student

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Kentucky Wesleyan College, Owensboro, Kentucky	BS (Hons)	08/2018	04/2022	Chemistry
Kentucky Wesleyan College, Owensboro, Kentucky	BS (Hons)	08/2018	04/2022	Biology
University of Kentucky, Lexington, Kentucky	PHD	08/2022	05/2027	Physiology

A. Personal Statement

The mystery surrounding my sister's neuromuscular disorder first sparked my interest in translational science. Her geneticist identified an abnormality in chromosome 6 but could not determine how it contributed to her condition. This uncertainty—how genetic changes manifest in disease—ignited my passion for biomedical research. During my career, I hope to be able to help transform genealogical discoveries into clinical actions.

I quickly realized that accessing research opportunities was not going to be easy. I grew up in rural western Kentucky without access to resources that many of my PhD classmates take for granted. I was very fortunate to be able to attend Kentucky Wesleyan College as an undergraduate, but it is a small liberal arts institution with limited infrastructure for research. However, I persisted and secured an opportunity in the lab of Rachel Pritchard, PhD, where I studied soil-derived antibiotics as tools to combat the growing crisis of drug-resistant pathogens. I used preliminary data from this project to build a successful application for the Wesleyan Fellowship, which funded 2 years of research. I disseminated first-author works at various local, national, and international conferences.

After admission into a PhD program at the University of Kentucky, I joined the lab of my primary sponsor, Ken Campbell, PhD where I was given the opportunity to shift my focus towards the genetics of human heart failure. Non-ischemic cardiomyopathies have a strong genetic component, yet nearly half of cases are idiopathic, much like my sister's condition. Despite this, genetic screening remains vastly underutilized in clinical settings. Our lab has spent 17 years building a cardiac biobank that now contains more than 20,000 specimens matched to clinical data. I spearheaded our lab's initiative to obtain sequencing data for 350 patients, presenting findings at numerous conferences and laying the foundation for a multi-omic atlas of heart failure patients in the greater Bluegrass region.

My PhD project centers on titin-truncating variants (TTNtvs), which cause premature protein translation stoppage and are amongst the most prevalent genetic contributors to non-ischemic cardiomyopathy. However, how TTNtvs lead to pathophysiology remains unclear. My project aims to address this gap by investigating if and how TTNtvs lead to overloaded cellular turnover pathways, accelerated aggregation of cytosolic residuals, and truncated titin filaments in sarcomeres. By integrating genomic, (immuno)histological, and biomechanical analyses, I aim to uncover novel therapeutic targets that will advance current treatments towards proactive, genetics-informed interventions.

Under the mentorship of Dr. Campbell, I will use my previous experiences in drug discovery and scientific communication as a conduit to provide insight into the pathophysiological underpinnings of heart failure. My training will be a first-hand perspective of the interconnectedness between research and medicine. I believe that this, including my previous research experiences, will provide a solid foothold for my long-term goal of leading a research team in cardiovascular genetics.

a. **Minton AT**, Wellette-Hunsucker AG, Gulbulak U, Milburn GN, Yackzan AT, Campbell KS. Multi-Omic and Biochemical Profiling of Heart Failure Specimens at the University of Kentucky. University of Kentucky Center for Clinical and Translational Research Spring Conference. 2025 (Podium Talk)
b. **Minton AT**, Wellette-Hunsucker AG, Gulbulak U, Milburn GN, Yackzan AT, Campbell KS. Genomic and Biochemical Profiling of Heart Failure at the University of Kentucky. Biophysical Society Annual Meeting. 2025 (Poster)
c. **Minton AT**, Yackzan AT, Wellette-Hunsucker AG, Milburn GN, Gulbulak U, Campbell KS. Genomic Characterization of Patients with Advanced Heart Failure at the University of Kentucky. Madison Myofilament Meeting. 2024 (Poster)
d. Cortazar AS, **Minton AT**, Gulbulak U, Campbell KS. Whole Exome Sequencing of a Myocardial Repository at the University of Kentucky. National Institutes of Health STEP-UP Program Annual Conference. 2024 (Podium Talk)

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2024 – **Member**, American Heart Association
2024 – **Member**, Biophysical Society
2023 – **Graduate Research Assistant**, Dr. Kenneth Campbell's Laboratory, Dept of Physiology, University of Kentucky College of Medicine
2020 – 2022 **Laboratory Assistant**, Div of Nat Sciences & Mathematics, Kentucky Wesleyan College
2020 – 2022 **Peer Tutor & Instructor**, Student Success Center, Kentucky Wesleyan College
2020 – 2022 **Member**, American Society for Microbiology
2019 – 2022 **Directed Researcher**, Div of Nat Sciences & Mathematics, Kentucky Wesleyan College

Honors

2023 **Featured in Fall 2023 Issue of *Pillars* as GOLD Alumnus**, institution's alumni magazine, Kentucky Wesleyan College
2022 **Invited Guest Speaker**, STEM Bridge Program, Kentucky Wesleyan College
2018 – 2022 **Presidential Scholarship**, partial tuition scholarship, Kentucky Wesleyan College
2020 – 2022 **Ellie Magnuson Memorial Endowed Fellowship Scholarship**, awarded to selected researchers majoring in chemistry, Kentucky Wesleyan College
2020 – 2022 **Wesleyan Fellowship**, awarded to selected researchers, Kentucky Wesleyan College
2020 – 2022 **Dean's List**, ≥3.5 semester grade point average, Kentucky Wesleyan College
2022 **President's Award**, awarded to a selected Greek Life member, Kentucky Wesleyan College
2022 **Program of the Year Award**, awarded to a selected organization leader who hosted a successful community-wide program, Kentucky Wesleyan College
2022 **Fraternity and Sorority Life Hall of Fame**, awarded to selected Greek Life members, Kentucky Wesleyan College
2022 **Student Government Association Senator of the Year**, Kentucky Wesleyan College
2022 **Order of Oak & Ivy Nominee**, institution's highest honor, Kentucky Wesleyan College
2022 **Chemistry Alumni Award**, awarded to a selected student majoring in chemistry, Kentucky Wesleyan College
2022 **Henry Milton Pyles Biology Award**, awarded to a selected student majoring in biology, Kentucky Wesleyan College
2021 **Interviewed on *Bench Talk: The Week in Science***, selected based on conference presentation award, Kentucky Academy of Science
2021 **Philip R. Edwards Microbiology Award**, awarded to a selected researcher in microbiology, Kentucky Wesleyan College
2021 **Oral Presentation Award Winner**, Kentucky Academy of Science, Eastern Kentucky University
2021 **Fraternity Man of the Year**, awarded to a selected fraternity member, Kentucky Wesleyan College
2021 **Dr. Ernest W. Abernathy Scholarship**, awarded to selected students majoring in chemistry or biology, Kentucky Wesleyan College
2020 **Oral Presentation Award Winner**, American Society for Microbiology, Vanderbilt University
2018 **Presidential Scholarship**, partial tuition scholarship, Kentucky Wesleyan College

C. Contributions to Science

1. **Genetic Variants in Heart Failure**

   Approximately 50% of patients with heart failure receive an idiopathic diagnosis. Moreover, animal models of many types of heart failure are nonrepresentative due to comorbidities such as hypertension, diabetes, and chronic lung diseases. There is a poor understanding of the link between heart failure and genetics, primarily due to the lack of genetic testing in this patient population. With Dr. Kenneth Campbell, I selected an experimental kit necessary to extract and purify nucleic acid eluants from specimens within the lab's myocardial repository. I used the extraction kit to derive a high-throughput protocol of extracting DNA and RNA from cryopreserved cardiac samples, which was utilized to extract DNA and RNA from 394 specimens. I coordinated with numerous genomics companies to determine the best sequencing platform, depth, coverage, and enrichment system to identify causal variants. 350 samples were sent for library preparation and whole exome/transcriptome sequencing. The collected data provided a genetic atlas of specimens within the myocardial repository, representative of heart transplant and ventricular assist device recipients in the greater Bluegrass region. Further analyses revealed trends in sequencing results and matched clinical data. Moreover, this dataset fostered research collaborations nationally and internationally.

   a. **Minton AT**, Wellette-Hunsucker AG, Gulbulak U, Milburn GN, Yackzan AT, Campbell KS. Multi-Omic and Biochemical Profiling of Heart Failure Specimens at the University of Kentucky. University of Kentucky Center for Clinical and Translational Research Spring Conference. 2025 (Podium Talk)
   b. **Minton AT**, Wellette-Hunsucker AG, Gulbulak U, Milburn GN, Yackzan AT, Campbell KS. Genomic and Biochemical Profiling of Heart Failure at the University of Kentucky. Biophysical Society Annual Meeting. 2025 (Poster)
   c. **Minton AT**, Yackzan AT, Wellette-Hunsucker AG, Milburn GN, Gulbulak U, Campbell KS. Genomic Characterization of Patients with Advanced Heart Failure at the University of Kentucky. Madison Myofilament Meeting. 2024 (Poster)
   d. Cortazar AS, **Minton AT**, Gulbulak U, Campbell KS. Whole Exome Sequencing of a Myocardial Repository at the University of Kentucky. National Institutes of Health STEP-UP Program Annual Meeting. 2024 (Podium Talk)

2. **Contribution of Variants in the Titin Gene to the Pathology of Dilated Cardiomyopathy**

   The Campbell Lab maintains and utilizes tissue from one of the world's largest human cardiac biobanks to perform cardiovascular research. Experimentation ranges from the single-myofibril to whole-organ level, providing insight applicable at the bench and the clinic. I collated clinical and whole exome sequencing data to identify patients who met dilated cardiomyopathy criteria and contained variants in the *TTN* gene. Using samples from these patients, I assisted in evaluating phosphorylation of proteins involved in myofilament calcium sensitivity (regulatory light chain, troponin I, and myosin-binding protein C) and relative abundances of contributors to intra/extracellular passive tension (collagen, alpha-tubulin, and titin). Findings differed from those previously collected by our lab, which included patients with truncating *TTN* variants (irrespective of dilated cardiomyopathy diagnosis). This hinted towards possible associations with the location of a genomic variant. To enable such comparisons, I mapped the exonic location of *TTN* variants based on the corresponding region of the sarcomere. Collected data has supported several conference presentations and serves as the basis of my dissertation research.

   a. **Minton AT**, Campbell KS. Effects of SGLT2i Treatment in Patients with Cardiac Titin Variants. University of Kentucky College of Medicine Department of Physiology Seminar Series: Trainee Talk. 2024 (Podium Talk)
   b. Wilkerson E, **Minton AT**, Wellette-Hunsucker AG, Gulbulak U, Campbell KS. Evaluating TTN Variants in Dilated Cardiomyopathy at the University of Kentucky. Kentucky Chapter of the American Physiological Society Annual Meeting. 2024 (Poster)

3. **Production of Novel Antibiotics from Soil Bacteria**

   Bacteria are becoming increasingly more resistant to commercially available antibiotics, leading to difficulty treating infections that were once subjective to such medications. Since antibiotics are commonly produced in bacteria inhabiting soil, this serves as a natural reservoir to identify and isolate novel antimicrobials. In coordination with Dr. Rachel Pritchard, I served as the lead investigator on a project that explored the ability to discover novel antibiotics from soil samples of various demographics. I revealed antibiotic production from thirteen bacterial isolates of four soil samples and assisted in optimizing an experimental technique to extract the antimicrobial compounds. Novelty of the bacteria was confirmed with 16S rRNA gene PCR, Sanger sequencing, and advanced biochemical testing. I cultivated stocks that were sent to the Tiny Earth Chemistry

Hub, a public database that preserves samples and records all experimental conditions, for use in further experimentation and possible application.

a. **Minton AT**, Pritchard R. Analysis of Purified Extracts from Antibiotic-Producing Bacterial Isolates. Kentucky Academy of Science Annual Meeting. 2021 (Podium Talk – Award Winner)
b. **Minton AT**, Pritchard R. Analysis of Bacterial Isolates Found in the Soil: Executing the Tiny Earth Project. Kentucky-Tennessee American Society for Microbiology Meeting. 2020 (Podium Talk – Award Winner)
c. **Minton AT**, Pritchard R. Analysis of Antibiotic-Producing Bacterial Isolates: Executing the Tiny Earth Project. Kentucky Wesleyan College Scholar's Day. 2021 (Poster)
d. **Minton AT**, Pritchard R. Analysis of Bacterial Isolates Found in the Soil: Executing the Tiny Earth Project. Tiny Earth Winter Symposium. 2020 (Podium Talk)

D. Scholastic Performance

YEAR	COURSE TITLE	GRADE
	KENTUCKY WESLEYAN COLLEGE	
2016	Fundamentals of General Chemistry	P
2016	Fundamentals of General Chemistry Lab	P
2017	Fundamentals of Organic Chemistry	P
2017	Fundamentals of Organic Chemistry Lab	P
2017	Medical Terminology from Greek & Latin	P
2017	Writing I	P
2017	Music Appreciation	P
2018	Calculus AB	P
2018	English II	P
2018	General Biology I Lab	A
2018	General Biology I	C+
2018	General Chemistry Laboratory I	A
2018	General Chemistry I	B+
2018	Freshman Seminar	A
2018	Introduction to Religion	A
2019	General Biology II Lab	A
2019	General Biology II	C+
2019	General Chemistry Laboratory II	A-
2019	General Chemistry II	B+
2019	Introduction to Psychology	A
2019	Survey of Christian Traditions	A
2019	Microbiology I	B
2019	Organic Chemistry Laboratory I	A
2019	Organic Chemistry I	A-
2019	Analytical Chemistry	B-
2019	American Literature Survey	A
2020	Genetics	A-
2020	Directed Student Research	A
2020	Organic Chemistry Laboratory II	B+
2020	Organic Chemistry	A-
2020	Fitness and Wellness	A
2020	Directed Student Research	A
2020	Statistics in the Behavioral Sciences	A
2020	Natural Science Junior Seminar	A
2020	Principles of Sociology	A
2020	General Physics	P
2020	College Physics Laboratory	P

2021	Cellular/Molecular Biology	B+
2021	Directed Student Research	A
2021	Immunology	A-
2021	Inorganic Chemistry	A
2021	Biochemistry	A
2021	Introductory General Physics II	A
2021	Introductory General Physics II Laboratory	A
2021	Biology of the Mind	B
2021	Directed Student Research	A
2021	Senior Seminar	A
2021	Advanced Integrated Lab I	A
2021	Computer Literacy	P
2021	Introduction to Human Geography	A
2021	Survey of American History I	A
2021	Evolution	A
2022	Physiological Psychology	A
2022	Directed Student Research	A
2022	Investigations in Molecular Cell Biology	A
2022	Ecology	A-
2022	Instrumental Techniques of Biochemistry	B
2022	Advanced Integrated Lab II	A
	UNIVERSITY OF KENTUCKY	
2022	Biomolecules and Metabolism	B
2022	Molecular Biology and Genetics	B
2022	Seminar in Integrated Biomedical Sciences	S
2022	Research in Integrated Biomedical Sciences	A
2022	Critical Scientific Readings	A
2022	Practical Statistics	A
2023	Ethics in Scientific Research	A
2023	Cell Biology and Signaling	B
2023	Physiological Communication	A
2023	Seminar in Integrated Biomedical Sciences	S
2023	Research in Integrated Biomedical Sciences	A
2023	Genomics & Bioinformatics Tools	A
	---Joined the Campbell Muscle Lab---	
2023	Systems, Cellular & Molecular Physiology	A
2023	Graduate Seminar in Physiology	A
2023	Readings in Systems, Cellular and Molecular Physiology	A
2024	Fellowship Grant Writing Workshop	A
2024	Advanced Topics in Physiology	A
2024	Research in Physiology	A
2024	Graduate Seminar in Physiology	A
2024	Qualifying Exam Residency Credit	P

*Kentucky Wesleyan College Grading System: Pass (≥70%), Fail (<70%); A (100-93%), A- (93-90%), B+ (89-87%), B (86-83%), B- (82-80%), C+ (79-77%), C (76-73%), C- (72-70%), D+ (69-67%), D (66-63%), D- (62-60%), F (<60%)

**University of Kentucky Grading System: Satisfactory (S; ≥70%), Non-Satisfactory (NS: <70%); A (100-90%), B (89-80%), C (79-70%), D (69-60%), F (<60%)