University Honors Program

Senior Portfolio Reflection

by Nathan Hall

When I entered NC State, I came in eager to learn and ready to get involved, but I did not yet understand what would most shape my undergraduate experience. Over time, I have come to realize that my development has not been defined by isolated accomplishments, but by an increasing willingness to step into responsibility — for research, for mentorship, for animals, for teams, and for younger students walking the path I once began. Across research laboratories, leadership programs, student organizations, classrooms, and service roles, my growth has followed a consistent pattern: learn carefully, contribute faithfully, and eventually guide others.

My academic formation began in structured coursework, but it matured through application. Early laboratory experiences in microbiology and genetics taught procedural precision: sterile technique, careful documentation, attention to controls. In MB 351 Honors, my team developed an interactive presentation exploring how marine microbes such as *Salinispora* and *Streptomyces* contribute to antimicrobial and anticancer drug discovery. Researching primary literature and designing an outreach module required translating complex biochemical pathways into accessible explanations. That project marked one of my earliest recognitions that scientific understanding is incomplete if it remains confined to technical language. The ability to communicate responsibly is not secondary to science; it is part of it.

Similarly, in GN 434 – Genes and Development, I independently researched the molecular and embryological origins of spina bifida. Integrating neural tube closure mechanisms, folate metabolism, and gene regulation pathways required synthesizing developmental biology with environmental risk factors. Designing a public-facing educational website forced me to move beyond memorizing mechanisms and toward

explaining them coherently. It required organization, clarity, and restraint — avoiding oversimplification while maintaining accessibility. In doing so, I began to see how translational research depends not only on discovery but also on responsible dissemination.

This theme extended into ANS 404, where my team conducted an evidence-based review of tail docking in dairy cattle. Examining mastitis incidence, somatic cell counts, fly load data, and regulatory changes challenged me to separate tradition from evidence. Agricultural practices often carry cultural momentum, yet scientific integrity demands evaluation grounded in data and welfare standards. Navigating conflicting perspectives strengthened my ethical reasoning and reinforced that animal science exists at the intersection of biology, economics, public perception, and policy.

Even my interdisciplinary Honors seminar in North Carolina Music reflected this pattern of investigation and translation. Producing a fifteen-minute podcast examining the influence of Christian faith on North Carolina country music required qualitative research, historical synthesis, and a recorded interview with Tony Conway, longtime manager of Randy Travis. Designing the proposal and interview strategy required initiative and professionalism; conducting the interview required adaptability; editing the final narrative required coherence. Though distinct from laboratory research, the project sharpened similar intellectual muscles: ask careful questions, verify claims, synthesize evidence, and communicate responsibly.

While classroom projects cultivated analytical thinking, research demanded ownership. In the Swine Metabolism Lab, I witnessed hypothesis-driven science unfold within a production animal context. Observing how metabolic research questions were translated into controlled feeding trials revealed the interplay between experimental design, logistics, funding, and animal management. Assisting with daily husbandry for hundreds of pigs, collecting growth and feed data, and participating in lab discussions grounded theory in operational reality. Research was no longer abstract. It required discipline, repetition, and collaboration.

That foundation deepened within the Translational Research in Pain (TRiP) Program. Contributing to clinical studies investigating canine osteoarthritis and pain mechanisms required both technical precision and analytical growth. Assisting with radiographs, supporting beagle arthrotomy procedures, collecting biological samples, and participating in gait analysis sessions using force plates and pressure-sensitive walkways immersed me in multimodal data collection. Yet the pivotal shift occurred when I transitioned from assisting with procedures to drafting abstracts, preparing posters, and contributing to manuscript-level analysis.

Presenting our thermography research at the CVM Annual Research Forum and Litwack Lecture Symposium marked my first experience defending methodology and limitations before faculty and researchers. Translating those findings at the NC Museum of Natural Sciences Brain Night required a different skill: explaining infrared thermography and gait analysis to public audiences without sacrificing accuracy. These experiences reinforced that rigorous research must be matched by rigorous communication. The abstracts that emerged from these projects — including our evaluation of medical infrared thermography as a screening tool in dogs with osteoarthritis and pharmacokinetic comparisons of extended-release buprenorphine — represented the first scholarly fruits of ongoing work. With manuscripts progressing toward journal acceptance and additional thermography analyses in development, I have come to understand research as a long-term commitment rather than a discrete accomplishment.

My research experiences also expanded beyond traditional species. Contributing to exotic animal studies involving jellyfish anesthesia protocols and reptile sedation trials required adaptability and attention to species-specific physiology. Monitoring physiological responses, collecting vital data, and assessing recovery patterns reinforced that methodological rigor applies across biological diversity. These experiences broadened my understanding of veterinary science and underscored that careful observation remains foundational regardless of model organism.

Yet research alone did not define my undergraduate trajectory. Leadership, mentorship, and organizational stewardship became equally formative.

The Leadership Development Program (LDP) served as a structured High Impact Experience that compelled me to articulate not only how I lead but why. Through workshops on strengths assessment, ethical decision-making, and communication, I confronted inconsistencies between stated values and enacted behavior. Applying these lessons within my role as an Awana small group leader grounded theory in lived practice. Guiding fifth-grade boys through discussions of grace, forgiveness, and character required patience, clarity, and adaptability. LDP shifted my understanding of leadership from position to alignment — aligning action with principle, influence with responsibility.

Serving as a Teaching Assistant for LSC 101 further deepened this development. Transitioning from student to facilitator required modeling intellectual discipline and fairness while mentoring first-year students navigating the transition to college-level science. Rather than delivering content, my role centered on cultivating analytical thinking — helping students construct arguments, evaluate evidence, and articulate reasoning. Evaluating assignments and guiding discussions sharpened my communication skills and reinforced that academic leadership means creating structure that enables others to succeed.

VetCAMP stands as one of my most transformative High Impact Experiences. Having first participated as a camper, I later returned as a counselor and panel speaker, mentoring 160 high school students across two summers. Leading laboratories in venipuncture, suturing, dissections, and turtle handling required preparation and composure, especially when stepping into unplanned teaching moments. Serving on the application review committee added a layer of weight to mentorship. Reading hundreds of applications from aspiring veterinary students revealed the competitiveness and complexity of the path. Evaluating others demanded humility and discernment. VetCAMP reshaped my understanding of leadership as stewardship — investing in those who follow.

My involvement in student organizations reinforced these lessons in collaborative contexts. In the Animal Science Club, I progressed from Rewards Chair to Parliamentarian to Junior and Senior Activities Chair. Maintaining attendance records and constitutional structure cultivated attention to detail and respect for governance. Coordinating major initiatives such as the NC State Fair Milk Booth, Ag Awareness Week, Club Day, and Farm Animal Days required logistical planning, delegation, budgeting, and trust. Contributing to a Milk Booth that generated over $100,000 in revenue and engaged more than 100,000 visitors demanded teamwork rather than individual recognition. Independently fundraising $1,250 through merchandise coordination and collaborating with Howling Cow Creamery to generate $4,850 in sales strengthened my understanding of financial stewardship and initiative.

Through the Pre-Veterinary Medical Association (PVMA), I deepened professional engagement. Receiving the Outstanding Excellence in Research Award and Outstanding Excellence in Animal Experience Award reflected peer recognition of sustained involvement. Serving as a guest speaker for the VetPAC Fall Seminar Series allowed me to mentor underclassmen beginning research journeys. Volunteering at the American Pre-Veterinary Medical Association Conference further reinforced the value of service within professional communities.

The Turtle Rescue Team (TRT) may be categorized as a club, but for me it functioned as a clinical apprenticeship. Contributing nearly a thousand hours of wildlife rehabilitation — calculating medications, performing husbandry, assisting with radiographs, practicing suturing — cultivated patience and attentiveness. Wildlife cannot articulate discomfort or advocate for themselves. That reality demands careful observation and consistency. Earning Turtle Ally Certification expanded my exposure to exotics medicine and connected me with wildlife professionals statewide. TRT grounded veterinary science in individual-animal responsibility.

Even participation in Swim Club contributed to this formation. Training consistently while balancing research and leadership commitments reinforced discipline,

time management, and resilience. Growth often occurred quietly — through early mornings and sustained effort.

Looking across these experiences, integration becomes evident. Studying abroad at Harper Adams University exposed me to quantitative gait analysis and physiotherapy techniques that later informed my work in canine osteoarthritis research. Organizing multi-species Club Day events sharpened logistical thinking that parallels coordinating research protocols. Facilitating classroom discussions improved my ability to defend methodology at scientific forums. Reviewing VetCAMP applications sharpened discernment and ethical evaluation. Translating developmental genetics for public audiences strengthened how I communicate pain pathway research. Designing outreach modules in microbiology reinforced my approach to Brain Night presentations.

This transfer of learning aligns with the Integrative Learning Value Rubric's emphasis on connecting experiences across contexts and applying skills in increasingly complex settings. My development has not been linear but cumulative. Skills learned in one domain resurfaced in another — analytical rigor informing ethical reasoning, communication skills enhancing mentorship, organizational discipline supporting research integrity.

Perhaps the most significant transformation, however, has been motivational. As a first-year student, I pursued opportunities primarily to build credentials. As a senior, I pursue them to build competence and character. Responsibility has replaced résumé-building as my primary motivator. I have learned that excellence is quiet consistency, that leadership is service sustained by preparation, and that scientific discovery carries moral responsibility.

The University Honors Program provided structure for this integration. Honors seminars pushed interdisciplinary thinking; Honors contracts extended coursework into deeper inquiry; experiential learning funds enabled study abroad; High Impact Experiences demanded reflection rather than participation alone. The program did not isolate achievement; it required synthesis. I would recommend UHP to future students

not because it guarantees distinction, but because it encourages intentional growth — prompting students to connect, reflect, and articulate their development.

The portfolio, and this very essay accompanying it, represent more than accumulated artifacts. They represent a trajectory — from learner to contributor to mentor. From performing assigned tasks to shaping projects. From participating in programs to helping lead them. From seeking opportunity to stewarding responsibility.

As I move toward graduate study and professional research, I carry forward more than technical competence. I carry analytical discipline cultivated in laboratories, ethical clarity sharpened through evaluation of controversial practices, mentorship refined through TA work and VetCAMP, logistical stewardship developed in organizational leadership, and a commitment to communicate science faithfully and responsibly.

As a first-year student, I was eager to explore widely; as a senior, I understand more clearly how those experiences connect and build upon one another, shaping who I am today.