

EDUCATION

Ph.D. in Chemistry

University of Wisconsin-Madison, Madison, WI

Aug 2021 – Dec 2025 (Expected)

Graduate Certificate in Entrepreneurship

University of Wisconsin-Madison, Madison, WI

Aug 2022 – May 2024

B.S. in Chemistry (ACS Certified); Minors in Biology and Mathematics

Appalachian State University, Boone, NC

May 2019

TECHNICAL SKILLS

Analytical Techniques: 2D-IR spectroscopy, FTIR, UV-Vis, 1D/2D NMR, HPLC, FPLC, MALDI-TOF MS.

Optical Instrumentation: Optical alignment, pulse shaping, phase cycling, laser diagnostics.

Biochemistry & Molecular Biology: Solid-phase peptide synthesis (SPPS); recombinant protein expression in *E. coli* using 20-L bioreactors; DNA cloning; SDS-PAGE, Western blot, ELISA; enzymatic assay development; qRT-PCR; mammalian cell culture; mouse handling (injections, blood collection, tissue isolation).

Computational Tools: MATLAB, Python, LabVIEW, Fusion 360, G-code (Marlin-based CNC/3D printers).

PROFESSIONAL EXPERIENCE

Graduate Research Assistant

University of Wisconsin-Madison, Prof. Martin Zanni

Aug 2021 – Present

Thesis Topic: Investigated the structure and dynamics of human islet amyloid polypeptide (hIAPP) oligomers, relevant to type-2 diabetes progression, using ultrafast two-dimensional infrared (2D-IR) spectroscopy.

- **Developed model peptides** that extended the lifetime of toxic transient oligomers up to 16-fold, enabling detailed structural characterization to inform therapeutic development.
- **Advanced methods** for ultrafast spectroscopy to mitigate thermal effects that improved the signal-to-noise ratio by 10-fold, enabling analytical study of biomolecules with high-repetition laser systems.
- **Synthesized and purified** isotopically labeled proteins with SPPS and HPLC, respectively.
- **Engineered nonlinear optics** to implement dual pulse shaping for novel phase cycling method.
- **Cultured tissue** to evaluate the in-cell and extracellular toxicity of hIAPP and mutants.
- **Chemical Hygiene Officer** responsible for SOPs, chemical waste, and operational safety.

Venture Fellow

2Flo Ventures, Chicago, IL

July 2024 – Present

Description: 2Flo Ventures is a startup studio and venture capital firm dedicated to accelerating healthcare innovations that expand access and improve outcomes for underserved communities.

- **Led technical & market due diligence** (AI-enabled devices, diagnostics, therapeutics); produced investment committee/CEO-ready memos with clear decisions, risks, and action items.
- **Modeled Financials:** DCFs, P&Ls, market share, and cap tables to value deals and forecast dilution.
- **Developed biotechnology regulatory pathway guidelines** for portfolio companies and advisors.
- **Authored thought leadership** pieces in key markets for advisor education and strategic investment.

Founder

Esterly Consulting LLC., Madison, WI

Oct 2024 – Present

Description: Esterly Consulting provides strategy, operations, and business development consulting for life-science startups, venture funds, and family offices.

- **Led Phase I SBIR proposal** for a chronic pain therapeutic, owning Specific Aims, Research Strategy, CRO-engagement, and timeline; delivered a submission-ready package on deadline.
- **Developed indication-selection strategy** for a preclinical therapeutic program, synthesizing market analysis, competitive and IP landscapes, and a literature-backed technical thesis.

- **Supported NSF I-Corps** customer discovery, 100 interviews, distilled themes into an evidence-backed go/no-go criteria, development and reimbursement risks, and narrowed value proposition.

Laboratory Manager**Aug 2019 – July 2021**

University of North Carolina at Chapel Hill, Prof. Gary J. Pielak

Project: Collaboration with BASF to study tardigrade proteins (TPs) for protection of commercial products.

- **Led research in collaboration with four international BASF research groups**; tracked action items, deadlines, delivered semi-annual research reports, and led bi-weekly research updates.
- **Novel assay development** to evaluate enzymes and microorganism stress with excipient proteins.
- **Designed E. coli expression systems** and optimized methods, scaling TPs production 20-fold.
- **Ensured operational efficiency** through maintenance and adherence to regulatory standards.
- **Managed sourcing of reagents and supplies** throughout global supply chain disruptions.
- **Authored semi-annual research reports** to update BASF on experimental results and milestones.
- **Delivered 20 grams of protein**, purified from >2000 liters of bacterial cultures.

Undergraduate Research Assistant**Aug 2018 – Aug 2019**

UNC Chapel Hill and Appalachian State University, Profs. Gary J. Pielak & Brooke Christian

Senior thesis: Evaluated toxicity and immunogenicity of CAHS D, a cytosolic abundant heat-soluble protein from tardigrades, for use as a biologic drug excipient to eliminate cold storage.

- **Handled mice** for subcutaneous injections, cheek bleeds and cardiac punctures.
- **Measured hemolysis** of CAHS D and controls *in vitro* with UV-Vis spectroscopy.
- **Developed indirect ELISA and quantified** anti-CAHS D antibody production from mouse serum.
- **Assessed toxicity** by ELISA through the quantification of proinflammatory cytokines, TNF α and IL-6.
- **Expressed, purified, and removed endotoxin** from bacterially expressed protein samples

Animal Research Facility Technician**Dec 2016 – May 2019**

Appalachian State University, Monique Eckerd

Description: Assisted in operation and research of university animal facility, working with investigators and administrators to ensure humane research standards.

- **Monitored and maintained** research animals in humane laboratory conditions.
- **Wrote protocols** with Institutional Animal Care and Use Committee (IACUC).
- **Participated in outreach events** to educate middle schoolers about science and biology.

Undergraduate Research Assistant**Nov 2016 – Aug 2018**

Appalachian State University, Prof. Brooke Christian

Project: Studied impact of mitochondrial oxidative aging in preadipocyte stem cells to understand the effects on adipogenesis and type-2 diabetes with in-vitro and ex-vivo murine models.

- **Excised and isolated** mouse embryonic fibroblasts (MEFs) and mouse preadipocytes.
- **Cultured and Differentiated** stem-cells into mature adipocytes.
- **Quantified gene expression and protein levels** with RT-qPCR and western blot, respectively.
- **Maintained, organized, and genotyped** transgenic mouse lineages.

PUBLICATIONS

Esterly, H. J.*; LaMasters, B.*; Ravula, T.*; Shivani, T. S.*; Maroli, N.; Rich, K. L.; Fields, C. R.; Stapleton, D. S.; Dicke, S. S.; Warmuth, O.; Keller, M. P.; Attie, A. D.; Kananenka, A. A.; Henzler-Wildman, K.; Rienstra, C. M.; Zanni, M. T. "Delaying the Onset of Aggregation Enables a Structural Model of a Toxic Amyloid Oligomer for hIAPP." *In Preparation*. **2025**. *Authors contributed equally.

Esterly, H. J.; Shivani, T. S.; Farrell, K. M.; Zanni, M. T. "Mitigation of Thermal Artifacts in 100 kHz Ultrafast 2D IR Spectroscopy" *Journal of Chemical Physics* **2024**, 161 (21), 214202.

Harrison J. Esterly

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Crilly, C. J.; Brom, J. A.; Warmuth, O.; **Esterly, H. J.**; Pielak, G. J. "Protection by Desiccation-Tolerance Proteins Probed at the Residue Level." *Protein Science* **2022**, *31* (2), 396-406.

Esterly, H. J.; Crilly, C. J.; Piskiewicz, S.; Shovlin, D. J.; Pielak, G. J.; Christian, B. E. "Toxicity and Immunogenicity of a Tardigrade Cytosolic Abundant Heat Soluble Protein in Mice." *Frontiers in Pharmacology* **2020**, *11*, 565969.

PRESENTATIONS

Esterly, H. J.; Farrell, K.M.; Shivani, T. S.; Zanni, M.T. **2023**. "Thermal Effects from 100 kHz 2D IR Spectroscopy and How to Mitigate Them." Poster Presentation, *Time Resolved Vibrational Spectroscopy*, Amsterdam, NL

Esterly, H. J. and Christian, B. E. **2019**. "Toxicity and Immunogenicity of a Tardigrade Cytosolic Abundant Heat Soluble Protein." Poster Presentation, *Experimental Biology Meeting*, Orlando, FL

Esterly, H. J. and Christian, B. E. **2017**. "Mitochondria-Targeted Catalase Inhibits Adipogenesis through ROS Reduction." Poster presentation, *Southeastern Regional Meeting of the American Chemical Society*, Charlotte, NC

AWARDS

GSFLC Mentor Award (UW-Madison)	Mar 2025
Research Pitch Travel Award (PPG)	Aug 2024
GSFLC Travel Award (UW-Madison)	July 2024
Howard H. Snyder Award (UW-Madison)	Jan 2023
Excellence in Research Award (App State)	Apr 2020
A.R. Smith Scholarship (App State)	Nov 2017

TEACHING EXPERIENCE

Physical Chemistry I and II Laboratory Teaching Assistant <i>University of Wisconsin-Madison, Madison, WI</i>	Aug 2024 - Present
General Chemistry II Teaching Assistant <i>University of Wisconsin-Madison, Madison, WI</i>	Aug 2021 - Dec 2021
Biochemistry Laboratory Teaching Assistant <i>Appalachian State University, Boone, NC</i>	Aug 2018 - Dec 2018
General Chemistry Laboratory Teaching Assistant <i>Appalachian State University, Boone, NC</i>	Aug 2016 - Dec 2016