

Dylan G. Chitwood

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Professional Preparation

Ph.D. Bioengineering – Cellular and Molecular Engineering Concentration May 2023
College of Engineering, Computing, and Advanced Sciences, Clemson University
Dissertation: Assessment of structure, function, and micro-evolutionary dynamics of extrachromosomal circular DNA in Chinese hamster ovary cells

B.S. Chemical and Biomolecular Engineering, Magna Cum Laude May 2019
Tickle College of Engineering, University of Tennessee, Knoxville
Honors thesis: Study Level Design of Thorium Oxide Production
(https://trace.tennessee.edu/utk_chanhonoproj/2288/)

Appointments

Graduate Research Assistant May 2019 – Present
Clemson University Department of Bioengineering

- Investigated the relationship between genome structure and function to phenotypic shifts in CHO cells in controlled and stressed conditions.
 - Tools and techniques utilized: ambr®250 HT bioreactor system, nucleic acid extraction and purification, PCR, RNA-seq, bisulfite-seq, circular DNA library preparation, gene ontology (GO) analysis, and integration of sequencing and cell culture data.
- Cultured induced pluripotent stem cells (iPSCs) for metabolic study.

Laboratory Technician September 2020 – Present
Clemson University Research and Education in Disease Diagnostics and Intervention Lab

- REDDI Lab conducts COVID-19 testing via high-throughput q-PCR on saliva samples of students, staff, and community members in the Clemson area. The CLIA-certified lab routinely handled thousands of samples per day during peak pandemic waves and returns results to patients in ≤ 24 hours.

Summer Research Scholar June -July 2016
University of Tennessee Health Science Center, Department of Neurology

- Assisted with pilot experiments for development of a mouse model of cervical dystonia using Cre-lox recombination under the supervision of a postdoc in Dr. Mark LeDoux's laboratory.
 - Responsibilities included aiding in stereotactic injections, phenotypic data collection, tissue staining, and presenting a summary of findings at the end of summer.

Peer-Reviewed Journal Publications (4)

Chitwood, D.G., Wang, Q., Klaubert, S.R. *et al.* Microevolutionary dynamics of eccDNA in Chinese hamster ovary cells grown in fed-batch cultures under control and lactate-stressed conditions. *Sci Rep* **13**, 1200 (2023). <https://doi.org/10.1038/s41598-023-27962-0>

Chitwood DG, Wang Q, Elliott K, Bullock A, Jordana D, Li Z, Wu C, Harcum SW, Sasaki CA. Characterization of metabolic responses, genetic variations, and microsatellite instability in ammonia-stressed CHO cells grown in fed-batch cultures. *BMC Biotechnol.* 2021;21(1):4. Epub 2021/01/10. doi: 10.1186/s12896-020-00667-2. PubMed PMID: 33419422.

Cordova LT, Dahodwala H, Elliott KS, Baik J, Odenewelder DC, Nmagu D, Skelton BA, Uy L, Klaubert SR, Synoground, BF, **Chitwood DG**, Dhara VG, Naik HM, Morris CS, Yoon S, Betenbaugh M, Coffman J, Swartzwelder F, Gilmeister M, Lee KH. (2022). Generation of reference cell lines, media, and a process platform for CHO cell biomanufacturing. *Biotechnology and Bioengineering*, 1– 11. <https://doi.org/10.1002/bit.28290>

Klaubert S, **Chitwood DG**, Dahodwala H, Williamson M, Kasper R, Lee KH, Harcum SW. Method to transfer Chinese hamster ovary (CHO) batch shake flask experiments to large-scale, computer-controlled fed-batch bioreactors. *Methods in Enzymology*. 2021; doi: [10.1016/bs.mie.2021.05.005](https://doi.org/10.1016/bs.mie.2021.05.005)

Conference Presentations (11)

Cell Culture Engineering XVIII; Cancun, Mexico; April 2023, Poster: *Characterization of extrachromosomal circular DNA (eccDNA) structure, function and dynamics in a CHO K-1 clone*; **Chitwood DG**, Wang Q, Klaubert SR, Green K, Wu C, Harcum SW, Sasaki CA

Centers of Biomedical Research Excellence (COBRE) Meeting; Greenville, SC; March 2023, Poster: *Assessment of structure, function, and microevolutionary dynamics of extrachromosomal circular DNA in Chinese hamster ovary cells*; **Chitwood DG**, Harcum SW, Sasaki CA

Advanced Mammalian Biomanufacturing Innovation Center Biannual Meetings, December 2020-June 2022, Update Posters (4), Final Update Talk (1)
Project: *Enhancing stability in CHO cells: Understanding the linkages between culture stress, chromatin, and gene expression* (Project 2019-12); **Chitwood DG**, Harcum SW, Sasaki, CA

American Chemical Society National Meeting August 2021, Hybrid meeting, Poster (General session, SciMix session) and BIOT Rapid Fire Talk, Poster/Talk: *Characterization of*

extrachromosomal circular DNA (eccDNA) content in a CHO K-1 clone; **Chitwood DG**, Klaubert S, Wang Q, Green K, Wu C, Harcum SW, Saski CA

American Chemical Society National Meeting August 2020, Virtual meeting, Poster: *Ammonia Induces Genome Instability in CHO cells*; **Chitwood DG**, Wang Q, Elliott K, Bullock A, Jordana D, Li Z, Wu C, Harcum SW, Saski CA

Honors and Awards

Michael A. Zebuhr Memorial Fellowship for Excellence in Graduate Research, Clemson University, Department of Bioengineering, Spring 2023

Clemson University Vice President of Research Doctoral Dissertation Completion Grant, Fall 2022

Clemson University Graduate Student Government Travel Grant (3)

Professional Memberships

American Chemical Society, ACS (2020-Present)

Professional Service

Facilitated weekly meetings between undergraduates participating in an NSF-funded summer Research Experience for Undergrads program at Clemson University (2020-2022)

Student Ambassador for the Tickle College of Engineering at the University of Tennessee, Knoxville (2017-2019)

Students Mentored

Kiana Green from University of South Carolina, CHOg2p Summer Research Experience for Undergrads program, (May-July 2021)

Aiyana Bullock from Delaware State University, CHOg2p Summer Research Experience for Undergrads program, (May-July 2019)