Tyler John Hansen

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EDUCATION:

Ph.D. Candidate, Biochemistry, Vanderbilt University, Nashville, TN, 2017-present

B.S., Biochemistry, University of Wisconsin-Madison, Madison, WI, 2011-2015

RESEARCH EXPERIENCE:

PhD Candidate, Department of Biochemistry, Vanderbilt University, Nashville, TN, 2018-present
Advisor: Emily Hodges, Ph.D.
Thesis Project: The development and application of ATAC-STARR-seq to investigate fundamental mechanisms of enhancer function in human evolution.

Post-Baccalaureate IRTA Fellow, Laboratory of Biochemistry and Genetics, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2015-2017
Advisor: Andy Golden, Ph.D.
Research Focus: Modeled rare human monogenic diseases in *C. elegans* for purposes of elucidating unknown disease mechanisms and developing potential drug treatments.

Undergraduate Researcher, Department of Biochemistry, University of Wisconsin-Madison, Madison, WI, 2012-2015
Advisor: Judith Kimble, Ph.D.
Research Focus: Investigated genetic regulation of germ cell fate using *C. elegans* as a model.

TEACHING AND MENTORING EXPERIENCE:

Assistant Facilitator, Vanderbilt University, Fall 2021 | Lead a first-year graduate student discussion group as a key contributor to the first-year IGP program. Teaching duties involved facilitating discussion of journal articles, assisting with problem set questions, and grading various assessments.

Undergraduate Mentor, Vanderbilt University, 2018-present | Mentoring an undergraduate researcher in relevant techniques, such as: ATAC-seq, electroporation transfection, flow cytometry, western blotting, human embryonic stem cell culture, and standard mammalian tissue culture.

Genome-Editing Instructor, National Institute of Diabetes and Digestive and Kidney Diseases, 2015-2017 | Trained a Ph.D. candidate and three NIH post-baccalaureate fellows in microinjection and CRISPR-based genome editing methods.

PUBLICATIONS:

Hansen, T., and Hodges, E. (2022) ATAC-STARR-seq reveals transcription factor-bound activators and silencers across the chromatin accessible human genome. *Genome Research.* doi: 10.1101/gr.276766.122

Rourke, C.K., Murat, D., **Hansen, T.**, and Jaramillo-Lambert, A. (2021) Endogenous localization of TOP-2 in C. elegans using a C-terminal GFP-tag. *microPublication Biology*. doi: 10.17912/micropub.biology.000402 PMID: 34095779

Guarnaccia, A. D., … **Hansen, T.**, … Tansey, W. P. (2021) Impact of WIN site inhibitor on the WDR5 interactome. *Cell Reports.* 34(3), 108636. doi:10.1016/j.celrep.2020.108636. PMID: 33472061

Fernando, L., Nguyen, V., **Hansen, T.**, Golden, A., & Allen, A. (2020). Loss of proteasome subunit RPN-12 causes an increased mean lifespan at a higher temperature in C. elegans. *microPublication Biology*. doi: 10.17912/micropub.biology.000234 PMID: 32550497

Barnett, K. R., Decato, B., Scott, T., **Hansen, T.**, Chen, B., Attalla, J., Smith, A., & Hodges, E. (2018). ATAC-Me Captures Prolonged DNA Methylation of Dynamic Chromatin Accessibility Loci During Cell Fate Transitions. *Molecular Cell*. *77*(6), 1350–1364. doi:10.1016/j.molcel.2020.01.004 PMID: 31999955

Iyer, J., Devaul, N., **Hansen, T.**, & Nebenfuehr, B. (2019). Using Microinjection to Generate Genetically Modified Caenorhabditis elegans by CRISPR/Cas9 Editing. Methods Mol. Biol., 1874, 431—457. doi: 10.1007/978-1-4939-8831-0_25 PMID: 30353529. (Invited book chapter).

Kim, S., Twigg, S. R. F., Scanlon, V. A., Chandra, A., **Hansen, T. J**., Alsubait, A., … Corsi, A. K. (2017). Localized TWIST1 and TWIST2 basic domain substitutions cause four distinct human diseases that can be modeled in *Caenorhabditis elegan*s. *Human Molecular Genetics*, *26*(11), 2118–2132. https://doi.org/10.1093/hmg/ddx107. PMID: 28369379.

Jaramillo-Lambert, A., Fabritius, A. S., **Hansen, T. J**., Smith, H. E., & Golden, A. (2016). The Identification of a Novel Mutant Allele of topoisomerase II in *Caenorhabditis elegans* Reveals a Unique Role in Chromosome Segregation During Spermatogenesis. *Genetics*, *204*(4), 1407–1422. https://doi.org/10.1534/genetics.116.195099. PMID: 27707787.

Kershner, A. M., Shin, H., **Hansen, T. J**., & Kimble, J. (2014). Discovery of two GLP-1/Notch target genes that account for the role of GLP-1/Notch signaling in stem cell maintenance. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(10), 3739–3744. https://doi.org/10.1073/pnas.1401861111. PMID: 24567412.

ORAL PRESENTATIONS:

Hansen, T., *Identifying transcription factor-bound activators and silencers in the chromatin accessible genome using ATAC-STARR-seq.* Presented at the 2022 Biochemistry Retreat, Chattanooga, TN, April 2022.

Hansen, T., *Investigating gene regulatory mechanisms of human evolution with ATAC-STARR-seq.* Presented at Biochemistry Student Association Colloquium, Vanderbilt University, TN, April 2022.

Hansen, T., *Simultaneous profiling of regulatory activity, chromatin accessibility, and transcription factor occupancy with ATAC-STARR-seq.* Presented at The 23rd Annual Vanderbilt University Program in Developmental Biology Retreat, Lake Guntersville State Park, AL, September 2021.

Hansen, T., *Investigating gene regulatory differences in primate immune cells with ATAC-STARR-seq.* Presented at Stem and Progenitor Cell Interest Group (SPRING) seminar, Vanderbilt University, TN, March 2021.

Hansen, T., *Using ATAC-STARR-seq to identify core units of transcriptional enhancers.* Presented at Biochemistry Student Association Colloquium, Vanderbilt University, TN, November 2019.

POSTER PRESENTATIONS:

Hansen T., Fong, S., Capra, J.A., & Hodges, E. *A genome-wide reporter assay reveals human specific gene regulation in both cis and trans*. Presented at Keystone Symposia: Gene Regulation: From Emerging Technologies to New Models – RESCHEDULED, Santa Fe, NM, June 2022.

Hansen T., Fong, S., Capra, J.A., & Hodges, E. *A genome-wide reporter assay reveals human specific gene regulation in both cis and trans*. Presented at the 2022 Biochemistry Retreat, Chattanooga, TN, April 2022.

Hansen T., Fong, S., Capra, J.A., & Hodges, E. *A genome-wide reporter assay reveals human specific gene regulation in both cis and trans*. Presented at Cold Spring Harbor Laboratory meeting on Systems Biology: Global Regulation of Gene Expression, Cold Spring Harbor, NY, March 2022.

***Hansen, T.** & Hodges, E. Using ATAC-STARR-seq to quantify the regulatory potential of chromatin accessible genomes.* Presented at the 5th Annual Cold Spring Harbor Laboratory meeting on Epigenetics and Chromatin, Virtual Conference, September 2020.

Hansen, T., Wilt, A., & Hodges, E. *Assaying Enhancer Activity with ATAC-STARR-seq.* Presented at the 22st Annual Vanderbilt University Program in Developmental Biology Retreat, Pickwick Landing State Park, TN, September 2019.

Hansen, T., Barnett, K., & Hodges, E. *A Functional and Unbiased Approach to Measure Global Enhancer Activity Dynamics During Cell Fate Transitions.* Presented at the 4th Annual Biochemistry Department Retreat, Vanderbilt University, February 2019. Also presented at the Epithelial Biology Center & Center for Stem Cell Biology Symposium, Vanderbilt University, April 2019.
Hansen, T. & Hodges, E. *Measuring enhancer activity dynamics during human pluripotent stem cell differentiation using ATAC-STARR.* Presented at the 21st Annual Vanderbilt University Program in Developmental Biology Retreat, Montgomery Bell State Park, TN, September 2018.

Hansen, **T.** & Golden, A. *Modeling NGLY1 deficiency in Caenorhabditis elegans.* Presented at the 21st International *C. elegans* Conference, Los Angeles, CA, July 2017. Also presented at the Mid-Atlantic Society for Developmental Biology Regional Meeting, University of Maryland-Baltimore County, Baltimore, MD, May 2017. Also presented at the 12th Annual NIDDK Scientific Conference, Bethesda, MD, April 2016.

Hansen, T., Chandra, A., Kim, S., Scanlon, V., Wilkie, A., Corsi, A., & Golden, A. *Modeling Craniofacial Diseases in Caenorhabditis elegans*. Presented at the Allied Genetics Conference, Orlando, FL, July 2016. Also presented at the Mid-Atlantic Society for Developmental Biology Regional Meeting, Howard University, Washington, D.C., May 2016. Also presented at the 11th Annual NIDDK Conference, Bethesda, MD, April 2016.

Hansen, T., Kershner, A., & Kimble, J. *Investigating the Nuclear Import Factor Regulation of Gamete Cell Fate.* Presented at the College of Agricultural and Life Sciences Undergraduate Research Seminar, University of Wisconsin-Madison, April 2013.

HONORS/AWARDS:

Keystone Symposia Travel Scholarship, Gene Regulation: From Emerging Technologies to New Models – RESCHEDULED, Santa Fe, NM, June 2022

Best Poster Award, The 2022 Biochemistry Retreat, Chattanooga, TN, April 2022

Best Poster Award - Honorable Mention, The 22nd Annual Vanderbilt University Program in Developmental Biology Retreat, Pickwick Landing State Park, TN, September 2019

Dean’s List Honors, University of Wisconsin-Madison, Spring Semester 2015

Dean’s List Honors, University of Wisconsin-Madison, Fall Semester 2014

PROFESSIONAL MEMBERSHIPS:

American Society of Human Genetics | 2022 - Present

American Association for the Advancement of Science Member | 2020 - Present

American Society for Biochemistry and Molecular Biology Member | 2019 - 2020