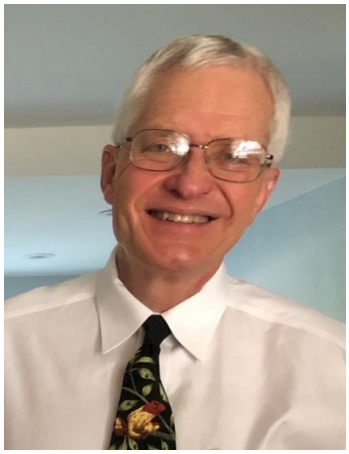
Dr. David Gross
Professor
Biochemistry and Molecular Biology
LSU Shreveport

| | | | |
|---|---|---|---|
| Northwestern University, Evanston, Illinois | B.A | 06/1974 | Biology |
| University of Colorado Medical Center, Denver | Ph.D. | 06/1981 | Biophysics |
| University of California – Irvine, California | | | Dissertation Research |
| University of Texas Southwestern Medical Center – Dallas, Texas | Postdoc | 08/1986 | Molecular Biology |



Dr. Gross' lab's primary research interest is to decipher how chromatin and chromosome structure regulate gene expression. In all their work, researchers have used budding yeast, the premier genetically tractable organism, as the model system. Their principal strategy has been to leverage the dynamic transcriptional response to heat shock (thermal stress) to gain insight into fundamental principles of chromatin and transcription. Dr. Gross' lab was amongst the first to demonstrate that transcription factor-nucleosome competition for promoter DNA is a critical mechanism underlying transcriptional regulation (Gross et al, 1993). They also were the first to demonstrate that the transcriptional induction of strongly expressed genes is accompanied by gene-wide displacement of histones with kinetics of nucleosome disassembly closely paralleling the rate of gene transcription (Zhao et al, 2005). Additionally, his lab demonstrated a critical role for Mediator in regulation of the yeast heat shock transcriptional response (Singh et al, 2006). In their work on silent heterochromatin, they demonstrated two key principles: (i) the transcriptional activator, and in certain contexts even Pol II, co-occupy silent chromatin with the heterochromatic machinery, thereby demonstrating that heterochromatin, like euchromatin, is dynamic (Sekinger & Gross, 2001); (ii) large increases in transcription can be observed in the virtual absence of covalent histone modifications often thought necessary for gene activation (Zhang et al, 2014). Finally, and perhaps most significantly, Dr. Gross' lab has demonstrated that genes regulated by a single transcription factor, Hsf1, and located on multiple chromosomes, undergo dramatic local restructuring and global repositioning upon their transcriptional activation. These *HSP* genes engage in intricate physical interactions that principally although not exclusively involve coding regions (Chowdhary et al, 2017; 2019; Rubio

et al, 2024) – and thus go well beyond previously defined enhancer-promoter interactions. This widespread restructuring is linked to the inducible formation of Hsf1 condensates (Chowdhary et al, 2022) and appears to be distinctive to the Hsf1 regulon (Chowdhary et al, 2019).

Dr. Gross has had 12 federal/national grants awarded with 35 years of near-continuous extramural funding (1988-2024).