

RESEARCH CURRICULUM VITAE

Molecular Biology | Genome Engineering | Protein Biochemistry | Advanced Imaging

Experimental researcher with a First Class Honours degree and over three years of wet-lab experience with mammalian cells, budding yeast, *C. elegans*, *Xenopus*, and zebrafish. Expertise includes genetic engineering, recombinant protein expression and large-scale purification, quantitative microscopy, and molecular and cellular phenotyping.

EDUCATION

BSc Honours, Molecular, Cellular and Developmental Biology | University of Alberta | 2021–2025

First Class Standing; Certificate of Research in Biological Sciences.

RESEARCH EXPERIENCE

- Investigated chromatin dynamics, DNA damage, and mitotic catastrophe in human cell lines using targeted chemical perturbations, endogenous protein tagging, FRAP, single-particle tracking, and quantitative fluorescence microscopy.
- Performed CRISPR/Cas9 genome editing and validation of tagged mammalian cell lines; analyzed histone mobility and cell phenotypes using confocal, widefield, and high-content imaging.
- Conducted budding-yeast genetics and SMC protein research, including strain engineering, PCR genotyping, tetrad dissection, and optogenetic CRY2-based experiments on protein interactions and intrinsically disordered regions.
- Expressed recombinant proteins in *E. coli* and performed large-scale protein purification with His/GST affinity methods, FPLC/HPLC, and size-exclusion chromatography; assessed protein purity and biochemical behavior.
- Generated and characterized CRISPR/Cas9-edited *C. elegans* strains to investigate genes involved in female meiosis; conducted molecular cloning, strain maintenance, microscopy, and genotype validation.
- Investigated developmental biology in *Xenopus laevis* and zebrafish using genome editing, immunostaining, tissue sectioning, Western blotting, and fluorescence microscopy.

RELEVANT TECHNICAL SKILLS

Molecular biology: PCR, qPCR, Gibson and Golden Gate assembly, plasmid construction, CRISPR/Cas9 editing, DNA/RNA extraction, RNase-free handling, gel electrophoresis, bacterial transformation, strain generation and maintenance.

Protein biochemistry: Recombinant protein expression, large-scale His/GST-tagged protein purification, affinity chromatography, FPLC/HPLC, size-exclusion chromatography, Western blotting, EMSAs, protein-nucleic acid interaction assays.

Cell systems and microscopy: Mammalian cell culture, budding yeast, *C. elegans*, *Xenopus*, zebrafish; confocal and widefield microscopy, spinning disc, FRAP, single-particle tracking, super-resolution imaging.

Sequencing and analysis: NGS library preparation, Illumina sequencing, R, Python, ImageJ, CellProfiler, Cellpose.

SCIENTIFIC COMMUNICATION & RECOGNITION

- Create original 3D molecular and cellular animations and scientific illustrations in Blender, including commissioned scientific visualizations.
 - NSERC Undergraduate Student Research Award (2024); academic merit scholarships (2021–2023); research poster presentations (2024).
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