MICAH GEARHART

INFORMATICS CONSULTANT

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Profile

Informatics analyist for data-intensive biomedical research projects requiring integrative approaches and effective vizualizations.

Skills

Cutting-Edge Informatics

Current with latest algorithms and genomics techniques.

Reproducible Research

Enabling robust and open analyses that can be updated as tools evolve and moves science forward.

Teaching & Mentoring

Expanding knowledge and enabling researchers with tools for independent data exploration.

Unique Qualifications

Biology Background

Trained in structural biology, transcriptional regulation and developmental biology.

Project Diversity

Specializing in unqiue projects not suited to conventional analyses.

Collaborative Analysis

Communicate with research team members to promote more meaningful approaches.

Employment

University of Minnesota

Bioinformatics Consultant, Genetics Cell Biology and Development **2014-present**

Collaborate with investigators to analyze and interpret next generation sequencing data. Facilitate transfer of knowledge regarding bioinformatics tools and statistical methods for functional genomics to research groups.

Research Associate **2007-2014**

Professor Vivian J. Bardwell

Education

University of Minnesota

Post-Doctoral Associate **2001-2007**

Professor Vivian J. Bardwell

The Scripps Research Institute

Doctoral Student **1995-2001**

Professor Peter E. Wright

Harvey Mudd College **1991-1995**

Bachelor's of Science in Chemistrry

Informatics Projects

Murphy MW, Lee J, Rojo S, **Gearhart MD**, Kurahasi K, Banerjee GL, Bashamboo A, McElreavey, K, Zarkower D, Aihara H, Bardwell VJ, "An ancient protein-DNA interaction underlying metazoan sex determination", *Nat. Struct. Mol. Bio.*, 2015 Jun;22(6):442-51.
This project relied heavily on my training in biochemistry, structural biology and genomics. An R package with custom software written specifically for this project is available at https://github.com/micahgearhart/exotools to assist other researchers attempting similar projects.

Lindeman RE, **Gearhart MD**, Minkina A, Krentz AD, Bardwell VJ, and Zarkower D. "Sexual cell fate reprogramming in the ovary by DMRT1", *Current Biology* 2105 16(25) 1-8.
Cutting edge analysis of RNA-seq and Single Cell RNA-Seq data were used to help elucidate how cells in the female ovary transdifferentiate into their male counterpart. A reproducible workflow can be found at https://github.com/micahgearhart/cag-dmrt1.

Gearhart MD, Erickson J, Walsh A, and Echeverri K. "Identification of conserved and novel microRNAs during tail regeneration in the Mexican Axolotl", *Int. J. Mol. Sci.* 2015, 16(9), 22046-22061.

This project highlights my ability to develop a de novo approach to work with the highly repetitive and unsequenced genome of the axolotl. A reproducible workflow can be found at https://github.com/micahgearhart/amex-miR.

Zhang T, Murphy MW, **Gearhart MD**, Bardwell VJ, Zarkower D. "The mammalian Doublesex homolog DMRT6 coordinates the transition between mitotic and meiotic developmental programs during spermatogenesis", Development. 2014 Oct;141(19):3662-71.

Deeply integrative project combining ChIP-seq, RNA-seq and mining public data repositories in order to better understand male fertility. A reproducible workflow is available at https://github.com/micahgearhart/umn-gcd-bioinformatics-dmrt6.

Scientific Publications

Cao Q, **Gearhart MD**, Gery S, Shojaee S, Yang H, Sun H, Mead M, Zhao Z, Lin D, Chen Q, Alkan S, Haferlach T, Müschenx, M, Bardwell VJ, Koeffler, HP, "BCOR controls maintenance of haematopoietic stem cell quiescence and regulates myeloid cell proliferation/differentiation." Manuscript Submitted. #

Béguelin W, Teater M, **Gearhart MD**, Goldstein RL, Cárdenas MG, Rosen M, Shen H, Corcoran CM, Hamline MY, Gascoyne RD, Levine RL, Abdel-Wahab O, Licht JD, Shaknovich R, Elemento O, Bardwell VJ, Melnick AM. "BCL6 and EZH2 cooperate to assemble a CBX8-BCOR Polycomb complex to repress bivalent chromatin, mediate germinal center formation and promote lymphomagenesis." Manuscript Submitted.

Yang, JA, Tubo, NJ, **Gearhart MD**, Bardwell, VJ, Jenkins, MK. "BCL6 interacting corepressor contributes to germinal center T follicular helper cell formation and B cell helper function", Journal of Immunology, 2015 Jun 15;194(12):5604-8.

Hatzi K, Jiang Y, Huang C, Garrett-Bakelman F, **Gearhart MD**, Giannopoulou EG, Zumbo P, Kirouac K, Bhaskara S, Polo JM, Kormaksson M, MacKerell AD Jr, Xue F, Mason CE, Hiebert SW, Prive GG, Cerchietti L, Bardwell VJ, Elemento O, Melnick A. "A hybrid mechanism of action for BCL6 in B cells defined by formation of functionally distinct complexes at enhancers and promoters." Cell Reports, 2013, 15(4), 578-88.

Junco SE, Wang R, Gaipa, JC, Taylor AB, Schrif V, **Gearhart MD**, Bardwell VJ, Demeler B, Hart PJ, Kim CA, "Structure of the Polycomb Group protein PCGF1 (NSPC1) in complex with BCOR reveals basis for binding selectivity of PCGF homologs", Structure, 2014, 21, 1–7.

Gearhart MD, Corcoran CM, Wamstad JA, and Bardwell VJ. "Polycomb Group and SCF Ubiquitin Ligases Are Found in a Novel BCOR Complex that is Recruited to BCL6 Targets." Molecular and Cellular Biology, 2006, 26, 6880-6889.

Gearhart MD, Dickinson, L, Ehley, J, Melander, C, Dervan, PB, Wright, PE and Gottesfeld JM. "Inhibition of DNA Binding by Human Estrogen Related Receptor-2 and Estrogen α Receptor with Minor Groove-Binding Polyamides." Biochemistry, 2005, 44, 4196-4203.

Gearhart MD, Holmbeck SMA, Evans, RM, Dyson HJ, and Wright PE. "Monomeric Complex of Human Orphan Estrogen Related Receptor-2 with DNA: A Pseudo-Dimer Interface Mediates Extended Half-site Recognition." Journal of Molecular Biology, 2003, 327, 819-832.

Technical Keywords

RNA-Seq	Variant Detection	R/Bioconductor
Single Cell RNA-Seq	Annotation / Species Comparison	Git / RMarkdown
ChIP-Seq / ChIP-exo	ggplot2 Visualizations	Linux / Bash