Richard (Zhifei) Dong

Add: 383 Tealby Crescent, Waterloo, Ontario, N2J 4Z8 Canada
Tel: (647) 202 0903 Email: richard.dong@uwaterloo.ca
Personal website available at https://www.dongrichard.com/

EDUCATION

University of Waterloo 09/2018-Present
Bachelor of Science in Life Physics, Medical Physics Specialization Waterloo, ON, Canada
Minor in Biology, with Bioinformatics Option Overall GPA: **4.0/4.0** (95%)
Selected Honors: Term's Honours List (All terms since Fall 2018)
President's Research Award (Sept. 2022)
President's International Experience Award (Aug. 2021)
Biology Upper Year Scholarship (Dec. 2021)
J. Frank Brookfield Scholarship for Excellence in Biology (Sep. 2019)
President's Scholarship of Distinction (Sep. 2018)

PUBLICATIONS

Bei, H., Xu, T., Zhou, J., **Dong, Z.,** Wang, Y., & Wong, K. et al. (2022). Evaporation-based, co-axial lock-and-key fibrous reservoir for long-term prevention of hypertrophic scars. Applied Materials Today, 27, 101463. https://doi.org/10.1016/j.apmt.2022.101463

Dong, Z., & Zhao, X. (2021). Application of TPMS structure in bone regeneration. Engineered Regeneration, 2, 154-162. https://doi.org/10.1016/j.engreg.2021.09.004

RESEARCH & PROJECTS

Modeling and Simulation of Glioblastoma Dynamics 07/2022-Present
Research Project, Supervised by Dr. Ernest Osei, Grand River Hospital in Kitchener, ON
- Aim to develop a mathematical model to describe the behavior of glioblastoma (GBM)
- Conducted a broad literature review to investigate the biological behavior of GBM vascularization, including angiogenesis, vasculogenesis, transdifferentiation, vessel mimicry, and vessel co-option
- Optimizing the existing model with experimental data to discover the correct modeling parameters and their values

An Investigation into the *Yersinia pestis* Pathogenicity and its Genome Reconstruction
Research Project, Supervised by Dr. Andrew Doxey, University of Waterloo
Part B: Identifying Novel Hosts and Reservoirs for *Yersinia pestis* (Undergraduate Thesis Project) 05/2022-Present
- Searched NCBI-SRA database for samples demonstrating the presence of *Y. pestis*
- Identified a new white-nose fungus being a reservoir or host for *Y. pestis*
- Conducting a metagenomic assembly of the target sample to reconstruct the genome of *Y. pestis*

Part A: Investigating *Yersinia pestis* Pathogenicity (BIOL 469 Group Course Project**)** 09/2021-12/2021
- Determined the source of pathogenicity for the most recent modern plague-causing strain of *Y. pestis* CO92 (Orientalis) with synteny analysis, GO terms analysis, and gene set comparisons
- Compared the target genome with other human pathogens & non-pathogens from the *Yersinia* genus
- Concluded that the close association with ubiquitination and host cell interaction could contribute to the cause of the high pathogenicity of *Y. pestis*

Transitional Regenerative Medicine Research in Bone Regeneration 01/2021-08/2021
Research Assistant, Supervised by Dr. Xin Zhao, The Hong Kong Polytechnic University
Lab Project: Investigating fibrous reservoir for long-term prevention of hypertrophic scars
- Engaged in the development of an evaporation-based co-axial electrospun fibrous scaffold system
- Performed both *in vitro* and *in vivo* experiments such as cell cultures and animal models to test scar-related gene expression in hypertrophic scarred bone tissues

Literature Review Project: Application of TPMS structure in bone regeneration
- Summarized academic articles on triply periodic minimal surface (TPMS) scaffold structures
- Discussed the effect of different parameters such as pore size, porosity, pore shape and the controlling and designing of different parameters on bone regeneration
- Revised manuscripts of both research and review articles for publication

Mathematical Modelling of SARS-CoV-2 In-Host Viral Dynamics and Its Potential Antiviral Treatments
Course Project, AMATH/BIOL 382 Course, Supervised by Prof. Brian Ingalls 01/2022-04/2022

- Simulated SARS-CoV-2 in-host viral dynamics with extended target cell model with Innate Immune Response (IIR) for antiviral drug targets
- Analyzed the simulated interactions using system biology and differential equation models in R
- Investigated several potential target sites for the antiviral drugs with simulation
- Proposed a hypothetical antiviral drug by activating the interferon production from IIR

PROFESSIONAL EXPERIENCE

Teaching Assistant, BIOL 130L Introductory Cell Biology Laboratory 09/2022-Present

- Hold weekly labs for first-year students and assist students in completing laboratory procedures
- Mark lab activities and reports

Editor-in-Chief, NG LAB Science Briefing 01/2020-Present

- Manage a social media account and compose science educational articles for the public
- Hold meetings with recruited authors, where progress is checked, and topics are assigned

Lecturer and Head of Science Department, University of Waterloo Easy Education 09/2019-12/2021

- Held and delivered presentations to incoming science students in welcome seminars
- Planned for all first-year science courses (MATH 127 – Calculus I, MATH 128 – Calculus II, CHEM 120/121 – General Chemistry I, and CHEM 123/125 – General Chemistry II)
- Prepared and taught review seminars for students in chemistry and calculus courses

Medical Editor, U-Link Business Solution 01/2020-04/2020

- Researched articles from journal databases and government websites and presented findings for clients
- Led the team in creating a series of lung cancer prevention videos

PROFESSIONAL SKILLS

Bioinformatics Tools: Database search (Ex: NCBI, UniProt. KEGG, etc.), Global/local sequence alignment and MSA, BLAST, Genome assembly, Genome annotation, Comparative genomics, Variant calling, Gene finding, Gene ontology (GO), Protein structure modelling, Phylogenetic analysis
Coding: Python, Dr. Racket, R
OS: Linux, macOS & Windows
Software: Prism, Image J
Languages: English and Mandarin Chinese