Postdoctoral Position in Medicinal Plant Genomics

Plant specialized metabolites include some of our most important medicines, but our understanding of how these natural products are produced in plants remains incomplete, which limits our ability to exploit key biosynthetic pathways. This postdoctoral position is part of a large-scale project funded by Alberta Innovates that focuses on the establishment of genomic resources in medicinally important plants, and the deployment of plant functional genomics as a gene discovery platform supporting the reconstitution of specialized metabolic pathways in microorganisms. The specific aims of this position will be to build de novo genome assemblies and/or improve existing resources and conduct comparative genomic analysis to study the evolution of specialized metabolic pathways in Cannabis sativa (THC, CBD and other cannabinoids), Catharanthus roseus (vinblastine), Tabernanthe iboga (ibogaine), and Ephedra sinica (ephedrine). High-quality genomes for these plants will be complemented through the establishment of de novo assemblies of related species, which we will use for comparative genomic analysis. A particular area of interest is an assessment of chromosomal clustering of specialized metabolism biosynthetic genes, and an analysis of how gene clustering might have evolved.

This project will generate substantial new data with many potential avenues for analysis. A combination of high-depth PacBio and Hi-C libraries will be used to build large contigs, which will be scaffolded to near chromosome scale. The ideal postdoctoral candidate will have direct experience using these types of data and the bioinformatic processing tools necessary for building and refining genome assemblies. Experience with phylogenetics, genome annotation, orthology identification, RNASeq analysis, and advanced skills in developing personalized analysis tools in R would also be highly desirable. The project provides investigative flexibility and extra research funding is also available for well-designed side-projects, so we welcome candidates that are highly motivated and imaginative.

This work will be performed in Sam Yeaman’s laboratory, and in collaboration with Dr. Peter Facchini and Dr. Kenneth Ng, in the Department of Biological Sciences at the University of Calgary. The Yeaman lab will provide a dynamic work environment with lots of potential to collaborate with other postdocs and grad students working on similar (but distinct) projects.

Applicants should send an up-to-date CV, a statement of research interests, and the names and contact information of three references to samuel.yeaman@ucalgary.ca.