Ivan Krukov

Ph. D. Candidate

Specialization

Evolutionary Biology

Bioinformatics

Institution

University of Calgary

Faculty of Medicine

Department of Biochemistry and Molecular Biology

Supervisor

Dr. A. P. Jason de Koning

Contact

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ivan-krukov

Current Positions

Ph. D. Candidate

Laboratory of Dr. A. P. Jason de Koning

University of Calgary, May 2014 - present

Devoloping exact approaches to analyze population genetic models. Simulation- and approximation-free methods to study behaviours of Wright-Fisher models of population genetics.

Education

Undergraduate degree in bioinformatics

Honors thesis program

University of Calgary, class of 2014

Graduating GPA of 3.8, Silver Medallion in bioinformatics (highest in-class GPA award)

Publications

Allele Age Under Non-Classical Assumptions of Clarified by an Exact Computational Markov Chain Approach

Nature Scientific Reports, Septemper 2017

Bianca de Sanctis, *Ivan Krukov*, A. P. Jason de Koning

Wright-Fisher Exact Solver (WFES): Scalable analysis of population genetic models without simulation or diffusion theory

Bioinformatics (Oxford), May 2017

Ivan Krukov, Bianca de Sanctis, A. P. Jason de Koning

FirebrowseR: an R client to the Broad Institute's Firehose Pipeline

Database (Oxford), January 2017

Mario Deng, Johannes Brägelmann, *Ivan Krukov*, Nuno Saraiva-Agostinho, Sven Perner

The genome and transcriptome of Haemonchus contortus: a key model parasite for drug and vaccine discovery

Genome Biology, August 2013

Roz Laing, Taisei Kikuchib, Axel Martinelli, Isheng J. Tsai, Robin N. Beech, Elizabeth Redman, Nancy Holroyd, David J. Bartley, Helen Beasley, Collette Britton, David Curran, Eileen Devaney, Aude Gilabert, Martin Hunt, Frank Jackson, Stephanie Johnston, *Ivan*

Krukov, Keyu Li, Alison A. Morrison, Adam J. Reid, Neil Sargison, Gary Saunders, James D. Wasmuth, Adrian Wolstenholme, Matthew Berriman, John S. Gilleard, James A. Cotton.

Conferences

Annual Meeting of the Society for Molecular Biology and Evolution

Generalized Mutation-Selection Models by a Diffusion-Free Approach

Austin, Texas, July 2017

Ivan Krukov, A. P. Jason de Koning; Poster presentation

Biochemistry and Molecular Biology Departmental Advance

Approximation-Free Solutions to Population Genetic Models

Banff, Alberta, April 2017

Ivan Krukov, Bianca de Sanctis, A. P. Jason de Koning; Poster presentation

Canadian Society for Computational Biology / Great Lakes Bioinformatics Conference

Approximation-Free Solutions to Population Genetic Models

Toronto, Ontario, May 2016

Ivan Krukov, Bianca de Sanctis, A. P. Jason de Koning; Poster presentation

Joint Canadian Genetics meetings

Hybrid Codon Models Allow Tunneling through Deleterious States

Vancouver, British Columbia, April 2015

Ivan Krukov, Bianca de Sanctis, A. P. Jason de Koning; Poster presentation

Annual Canadian Institutes of Health Research and Statistical Genetics Conference

Statistical Power to Detect Co-evolution as a Consequence of Epistasis in Protein Coding Genes

Victoria, British Columbia, April 2014

Ivan Krukov, A. P. Jason de Koning; Poster presentation

Teaching

Research Designs in Molecular Biology and Bioinformatics - MDSC 408

Bachelor of Health Sciences program

University of Calgary, September 2016, September 2014

Instructor, Bioinformatics module

Machine Learning Workshop - theory, applications, and practice

Canadian Society for Computational Biology / Great Lakes Bioinformatics Conference

University of Toronto, May 2016

Instructor, with Jeffrey A. Wintersinger

External Training Courses

Workshop on Molecular Evolution

Woodshole, Massachusetts, July-August 2014

Research Experience

Undergraduate researcher

Laboratory of Dr. A. P. Jason de Koning

University of Calgary, September 2013 - April 2014

Investigating patterns of constrained evolution in vertebrate genomes. Employing infinite mixture models to study genomic functional elements. Studying novel models of biological sequence evolution and developing simulation methods of genetic data.

Undergraduate researcher

Laboratory of Dr. James Wasmuth

University of Calgary, May-August 2013

Characterizing diversity of cysteine proteases in the phylum *Nematoda*. Using computational approaches to investigate nature of parasitism and genome evolution.

University of Calgary, September 2012-2013

Undergraduate thesis work on the immune evasion mechanisms by parasitic nematodes. Using computational approaches to mine genomes and to investigate evolutionary biology of nematodes.

University of Calgary, September 2012-2013

Fall-Winter research project on drug resistance in nematodes. Using large-scale RNA-sequencing methods to characterize molecular mechanisms of drug resistance in *Caenorhabditis elegans*.

University of Calgary, May-September 2012

Summer research project on the metabolism of giant pig roundworm *Ascaris suum*. Performed functional annotation of the genome and constructed a metabolic network for the organism.

Software developer

Lindsay Virtual Human Project, Laboratory of Dr. Christian Jacob

University of Calgary, May-August 2011

Software design and development in the Lindsay Virtual Human project with Dr. Christian Jacob. Was responsible for UI redesign for the Lindsay Composer project

Undergraduate researcher

Lab of Dr. Belinda Heyne

University of Calgary, May-August 2010

A research project under supervision of Dr. Belinda Heyne, focusing on testing active components of a photodynamic treatment for prostate cancer.

Awards and Resarch Grants

Alberta Innovates Technology Futures Doctoral Research Grant

2014-2018

NSERC Host-Parasite Interactions Research Studentship

2013

O'Brien Center Summer Research Studentship

2013

Markin USRP Fall-Winter Research Studentship

2012

Jason Lang Scholarship

2012, 2011, 2010

Faculty of Veterinary Medicine: best oral presentation

2012

Department of Ecosystem and Public Health: Summer Studentship

2012

Faculty of Veterinary Medicine: Summer Studentship

2012

O'Brien Center Summer Research Studentship

2011

Markin USRP Summer Research Studentship

2010

UofC Alumni Association Graeme Bell Distinguishing Alumni Bursary

2009

University of Calgary Admission Scholarship

2009