

PHD BIOMEDICAL ENGINEERING CANDIDATE · MACHINE LEARNING SPECIALIST · DATA SCIENTIST & BIOINFORMATICIAN

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Proactive, solutionist, & multidisciplinary researcher with 7+ years working on data science, machine learning, and bioinformatics projects. Lectured at both the undergraduate and postgraduate levels. Mentored 3 B.Eng honours projects & 2 M.Eng theses. Current Executive Editor of the Health Science Inquiry journal. Served as Associate Technical Chair for the Global Signals & Information Processing conference symposium. Published 12 articles in peer-reviewed journals & conferences. Currently involved in a broad range of active projects.

Education

Carleton University

Ottawa, Canada

Ph.D. BIOMEDICAL ENGINEERING CGPA: 4.0

September 2015 - Present

· M.A.Sc. Fast-Track to Ph.D.

Indian Institute of Technology Bombay

Mumbai, India

VISITING SCHOLAR

August 2016 - December 2016

McGill University

Montreal, Canada

B.Sc. Biology & Computer Science, CGPA: 3.40

September 2011 - May 2014

Experience _____

Agriculture Canada, Government of Canada

Ottawa, Canada

CONTRACT RESEARCH SCIENTIST

September 2017 - Present

- · Contract research project to elucidate protein-protein interactions between soybean and humans relevant to human health
- Generated and analysed over 4TB worth of prediction data
- Performed network-based analysed of comprehensive interactomes and defined new metrics to quantitatively measure the importance of interactions with respect to specific protein functions
- Tools: Python, Multiple Private/Public Compute Clusters, Cytoscape, Scikit-learn, Matplotlib

Dept. Natural Resources, Government of Canada

Ottawa, Canada

CONTRACT RESEARCH SCIENTIST

January 2017 - April 2018

- Three month contract research project on the application of deep learning for the identification of threats to critical infrastructure.
- **Responsibilities:** Reviewing and critically assessing the literature on computer vision; proposing innovative solutions to alleviate the resource burden on critical infrastructure; developing and implementing the proposed solution; preparing and executive-level report on the literature and proposed application.
- Skills: TensorFlow (trained and tested a CNN), Google API (generated a dataset population of Street View images), Image Annotation using LabelMe

Dr. Patankar Lab, IIT Bombay

Mumbai, India

GLOBAL RESEARCH INTERNSHIP

August 2016 - December 2016

• Bioinformatic study of Malaria-causing *Plasmodium falciparum* to elucidate novel protein transport pathways of clinical therapeutic relevance.

Dr. James Green Lab, Carleton University

Ottawa, Canada

RESEARCH ASSISTANT

September 2015 - Present

- · Working on several machine learning projects in the field of bioinformatics for protein-protein interaction prediction.
- Project: Zika-Human protein-protein interaction prediction for potential drug targets.
- **Project:** Malaria parasite protein-protein interaction prediction
- **Project:** Large-scale comparison of protein sequence- and structure-based methods
- Project: Identification of unvaccinated individuals in Canada
- Project: SNP-based prediction of in human proteomes for personalized interactomes
- Project: Web service development for improved dataset quality
- Project: Deep learning models for tongue classification in speech therapy

Revision MilitaryOttawa, Canada

TEST AND TRIALS SPECIALIST

June 2014 - June 2015

• Responsible for designing and programming the interactive interface of intelligent battery systems, communicating between the enduser and the engineering team, and ensuring human factors compliance with established military standards.

- Developed a virtual tablet application to engage end-users and acquire feedback.
- Designed and prototyped cables to intelligently interface with existing military devices.
- Developed embedded software validation routines and firmware update applications.

Dr. Murgita Lab, McGill University

Montreal, Canada

RESEARCH ASSISTANT

January 2013 - May 2013

- Developing Java-based software to model and evaluate transient protein-protein interactions as a pharmaceutical tool for drug development and design.
- Member of a team of programmers developing, validating and iterating the software.
- Applied knowledge in biology and biophysics to design algorithms.

Dr. Zetka Lab, McGill University

Montreal, Canada

RESEARCH ASSISTANT

September 2013 - May 2013

- · Acquired primary data from C. elegans model organism, studying chromosomal interactions during meiosis.
- Skills: PCR genotyping, DNA extraction, preparing solid growth media, plasmid micro-injection, experimental design

Skills _

Programming Python, R, MATLAB, Java, C/C++, Javascript

Libraries Scikit-learn, Scikit-surprise, TensorFlow, PyTorch, Matplotlib, Numpy, Pandas, Plotly, Selenium, BeautifulSoup

OS Unix, MacOS

Web D3, Node, React, HTML, CSS, PHP

Wet Lab PCR Genotyping, DNA Extraction, Preparing Solid Growth Media, Plasmid Micro-Injection, Generation of Double Mutants

(C. elegans)

Languages Mother Tongue: English, French; Beginner: Hindi, Spanish

Publications & Conference Papers _

Emergence of an Autonomous Vehicle Secondary Data Market for Remote Sensing

K. Dick, Joe Samuel, J. R. Green

MANUSCRIPT IN PREPARATION

• To be submitted to Technovations

u-Index: An Author-Specifiable Metric of Research Productivity

K. Dick

MANUSCRIPT IN PREPARATION

• To be deposited on arXiv & submitted to Scientometrics

Reciprocal Perspective Visualization Framework

K. Dick, F. Charih, J.R. Green

MANUSCRIPT IN PREPARATION

• To be Submitted to PLoS Computational Biology

Reciprocal Perspective: A Cascaded Semi-Supervised Learning Layer for Improved Classification & Regression

K. Dick, J.R. Green

MANUSCRIPT IN PREPARATION

To be Submitted to the Journal of Machine Learning Research

PIPE4: Fast PPI Predictor for Comprehensive Inter- and Cross-Species Interactomes

K. Dick et al.

MANUSCRIPT UNDER REVIEW

- Accepted in Nature's Scientific Reports
- To appear in print Winter 2020
- Supporting Datasets: doi.org/10.5683/SP2/PVOTRN

Insights into the suitability of utilizing brown rats (Rattus norvegicus) as a model for healing spinal cord injury with epidermal growth factor and fibroblast growth factor-II by predicting protein-protein interactions

Nashira Grigg, Andrew Schoenrock, **Kevin Dick,** et al.

COMPUTERS IN BIOLOGY AND MEDICINE

· doi.org/10.1016/j.compbiomed.2018.11.026

Nov. 2018

Fitting Rank Order Data in the Age of Context

K. Dick, J.R. Green

PROCEEDINGS OF THE 2ND IEEE LIFE SCIENCES CONFERENCE

Oct. 2018

- Demonstrated that a new class of asymmetric kernel functions for non-parametric line fitting can lead to improvements in classification performance of context-based methods.
- doi.org/10.1109/LSC.2018.8572090

Deep Learning for Critical Infrastructure Resilience

K. Dick, L. Russel, Y. Souley Dosso, F.

Kwamena, J.R. Green

ASCE JOURNAL OF INFRASTRUCTURE SYSTEMS

Jan. 2019

- Reviews recent progress in deep learning methods and explores their potential application to critical infrastructure protection
- A case study is presented wherein Transfer Learning is used to classify power-related infrastructure from vehicle-mounted cameras.
- doi.org/10.1061/(ASCE)IS.1943-555X.0000477

Reciprocal Perspective for Improved Protein-Protein Interaction Prediction

K. Dick, J.R. Green

SCIENTIFIC REPORTS, NATURE PUBLISHING GROUP

Aug. 2018

- Introduces a novel meta-machine learning method which leverages context-based features from comprehensive PPI interactomes.
- DOI:10.1038/s41598-018-30044-1

Systematic Street View Sampling

K. Dick, F. Charih, Y. Souley Dosso, L.

Russell, J.R. Green

PROCEEDINGS OF THE 15TH CONFERENCE ON COMPUTER AND ROBOT VISION

May 2018

- Introduces a Python/NodeJS package which leverages Google APIs to rapidly generate user-defined datasets of Street View imagery
- Systematically samples the Street View imagery to avoid introducing bias
- doi.org/10.1109/CRV.2018.00028

Positome: A Method for Improving Protein-Protein Interaction Quality and Prediction Accuracy

K. Dick, F. Dehne, A. Golshani, J.R.

Green

PROCEEDINGS OF THE IEEE INTERNATIONAL CONFERENCE ON COMPUTATIONAL INTELLIGENCE IN BIOINFORMATICS

AND COMPUTATIONAL BIOLOGY 2017

Aug. 2017

- Introduces a web service to generate user-defined PPI datasets to address data provenance and data quality challenged in biological repositories
- · doi.org/10.1109/CIBCB.2017.8058545

Designing Anti-Zika Virus Peptides Derived from Predicted Human-Zika Virus Protein-Protein Interactions

T. Kazmirchuk, **K. Dick**, et al.

JOURNAL OF COMPUTATIONAL BIOLOGY AND CHEMISTRY

Sept. 2017

- Leverages two sequence-based PPI predictors to identify therapeutic drug targets from Human-Zika Virus interactome-wide predictions.
- · doi.org/10.1016/j.compbiolchem.2017.10.011

Comparison of Sequence- and Structure-Based Protein-Protein Interaction Sites

K. Dick & J.R.Green

PROCEEDING OF IEEE INTERNATIONAL STUDENT CONFERENCE

Feb. 2016

Identifying Unvaccinated Individuals in Canada: A Predictive Model

K. Dick, A. Nordstrom

arXiv

• arXiv Preprint: https://arxiv.org/abs/1607.08656

- Poster presented at Data Day 3.0 Conference on March 29th, 2016
- Published on F1000: https://f1000research.com/posters/5-1937

WEDNESDAY 22ND JULY, 2020

KEVIN DICK · CURRICULUM VITAE

Jul. 2016

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Teaching & Courses

ECOR 4995 - Professional Practise

Carleton University

Teaching Assistant Fall 2019

• Revised the work of 56 engineering students weekly.

HLTH 2001 | 4102 - Health Research Methods and Skills | New Health Technologies

Carleton University

Nov. 2018

• The Genomic Era & the Zika Virus

- · Described the history of sequencing technology and the emergence of Next-Generation Sequencing.
- Described post-genome era research, emphasizing CRISPR-Cas9 technology.
- Recounted prior work on the designing peptides for Zika virus.

COMP 4308/BIOC 4008 - Computational Systems Biology

Carleton University

GUEST LECTURER

GUEST LECTURER

Mar. 2018

· Reciprocal Perspective

• Elaborated upon the Reciprocal Perspective framework for protein-protein interaction predictions.

HLTH 5350 - New Health Technologies

Carleton University

Guest Lecturer Nov. 2017

· The Genomic Era

- Presented an overview of the emerging field of Complexity Science
- Recounted the history of genomic technologies
- Described current research (emphasizing the role of machine learning).

COMP 4308/BIOC 4008 - Computational Systems Biology

Carleton University

Guest Lecturer Mar. 2017

- · Python Pipelining: An Introduction to Building Data Analysis Pipelines (& Hacking Graduate School)
- Prepared and taught a fully interactive session on building flexible and scalable data analysis pipelines.
- Website: http://bioinf.sce.carleton.ca/PythonPipelining/

Enrichment Mini-Courses Program

Carleton University

LECTURER AND WORKSHOP INSTRUCTOR

May 2016 & 2017

- Developed a day-long program accessible to High School students on the topic of Biomedical Informatics, Data Science, and Machine Learning.
- Developed a hands-on workshop to collect accelerometer data to create a "Belt Buckle FitBit" to classify different types of activities.
- Implemented a basic MATLAB framework to access and analyze the data, including a competition to train the best classifier and achieve the highest overall accuracy.

SYSC 3303 - Real-Time Concurrent Systems

Carleton University

TEACHING ASSISTANT

• Website: http://www.sce.carleton.ca/courses/sysc-3303/s17/

Summer 2017

SYSC 3101 - Programming Languages

Carleton University

TEACHING ASSISTANT

Winter 2016-2019

· Mentored and taught student basic principles of functional and object-oriented programming languages.

SYSC 1005 - Introduction to Software Development

Carleton University

TEACHING ASSISTANT

Fall 2015-2018

• Mentored and taught student basic principles of Python programming.

Extracurricular Activity

The Coronavirus Kindness Project

Global

April 2020 - Present FOUNDER & "CTO"

- · Motivated to share and spread stories of acts of kindness around the world, an interactive website was developed using D3. is and the Leaflet library.
- Made all design and branding decisions.
- Oversaw the a team of 10+ volunteers contributing to the collection and dissemination of news articles.

Health Science Inquiry Toronto, Canada

EXECUTIVE EDITOR

NEWS REPORTER

October 2019 - August 2020

- Spearheaded the initiative to migrate to Open Journal Systems.
- Coordinated with the University of Alberta's Library Staff to re-brand the website.
- Coordinated the call, reception, and peer-review of main submissions.
- Reported to the Editor-in-Chief and engaged in regular meetings and brainstorming sessions.

Health Science Inquiry Toronto, Canada

SENIOR EDITOR & LAYOUT ASSOCIATE

October 2018 - August 2019

- Coordinated the reception and peer-review of main submissions.
- Created the new ETFX class template for future issues.
- Reported to the Editor-in-Chief and engaged in regular meetings and brainstorming sessions.

Health Science Inquiry Toronto, Canada

- October 2017 August 2018 • Wrote articles on research being conducted by Canadian scientists
- Conducted phone and e-mail interviews with scientists to profile their work in greater detail · Reported to the Manager of News Articles, and engaged in regular meetings and brainstorming sessions
- · Contributed two articles spanning topics of health science research for publication in the annual circulation.

Infinity Institute Ottawa, Canada

DIRECTOR & FOUNDER & EDITOR-IN-CHIEF

July 2017 - September 2018

- · Founded the think tank and digital magazine, overseeing all aspects of running a not-for-profit digital magazine
- Oversaw the editorial process and managed a team of seven editors.
- Developed and executed marketing strategies to generate a strong community following.
- · Coordinated group activities and club funding.
- Organized and ran numerous workshops, social, and professional development events.
- Designed and created all branding material and website presence.

Carleton University Engineering in Medicine and Biology Society

Ottawa, Canada

Co-Chair

September 2015 - September 2019

- · Coordinated group activities and club funding.
- Organized and ran numerous workshops, social, and professional development events.
- · Helped coordinate a highly successful International Student Conference, an IEEE EMBS flagship event.

Graduate Student Association

Ottawa, Canada

DEPARTMENT REPRESENTATIVE (SYSTEMS AND COMPUTER ENGINEERING)

September 2015 - August 2018

- Represented the Systems and Computer Engineering Department at the pan-university council meetings.
- Was a voting member of the council.
- · Raised and discussed key issues about campus events and planned the future directions of the university as an advocate of the engineering faculty.

WEDNESDAY 22ND JULY, 2020 KEVIN DICK · CURRICULUM VITAE

International Student Conference 2016

Korea May 2016

CORE MEMBER & VOLUNTEER & WORKSHOP LECTURER

- Undertook various volunteering tasks: Program Committee, Publications Committee, Advertisement and Marketing Committee, etc.
- Ran a highly successful workshop targeted to High School students, title: "Welcome to the World of Biomedical Engineering"
- Helped secure over \$3000 in funding to support our initiatives.
- · Helped document the conference organization to enable future groups achieve similar levels of success.
- Received the "Outstanding Performance Award" on behalf of the ISC organization team at the Engineering in Medicine and Biology Society flagship conference 2017 in Jeju, South Korea.

Ottawa-Carleton Science Fair

Ottawa, Canada

JUDGE

April 2016 & 2017

- Judged the science fair projects of High School students throughout the National Capital region.
- Recommended the most prominent projects to advance to the final rounds.

Hacking Health Hackathon

Ottawa, Canada

HACKATHON PARTICIPANT & BLOGGER

May 2017

- Participated in the first Hacking Health Hackathon in Ottawa, as part of a team of 10 members innovating a three-part solution to improved Sleep Apnea diagnosis in children.
- Winner of the Pilot Opportunity Award enabling us to implement our solution at the Children's Hospital of Eastern Ontario
- Recapped my experience as a Blog article shared by Hacking Health Ottawa to disseminate the success of the event.
- Article: http://hackinghealth.ca/hacking-health-ottawa-hackathon-2017/

Hacking Health Ottawa Ottawa, Canada

BEOOGER

Participated in and reported on the ongoing events of Hacking Health Ottawa.
As an avid writer and proponent for multidisciplinary innovation in healthcare, I am proud to contribute to Hacking Health's vision as Blogger!

McGill Biology Student Union

Montreal, Canada

January 2017 - PRESENT

VP SOCIAL

June 2013 - June 2014

- Organized and execution social events (e.g. Barbecues, pub-crawls, wines-and-cheeses, intra- and inter-departmental competitions), etc.
- Raised funds for the social events and charitable causes (over \$3K raised in total)
- Participated in weekly MBSU meetings and led sub-committees.
- Held MBSU office-hours for three hours a week and managed transactions of office goods and services.

Honors & Awards & Grants

DOMESTIC

2016

Queen Elizabeth II Graduate Scholarships in Science and Technology, Queen Elizabeth Scholars

2019-2017 engage with communities, learn about cultures and create projects and actions that impact the world. Awarded for academic excellence, research potential, and leadership.

Carleton FGPA

Research Support Award, Awarded to support the presentation of promising research at the CRV 2018 conference in Toronto, Canada.

NRC Digital Technologies

Koningstein Scholarship for Excellence in Science and Engineering, Awarded annually to
 2017 outstanding graduate students entering or enrolled in the Faculty of Science and the Faculty of Engineering and Design.

Research Centre

Carleton FGPA

2015 Allan Buchanan Award, For Academic Excellence.

Carleton Academic

2nd Place - Poster Competition, Data Day 3.0 Conference

Data Science Institute

Dept.

Lieutenant-Governor of Quebec Award, For being a source of inspiration to others through exceptional volunteer work.

Hull, Canada

WEDNESDAY 22ND JULY, 2020

KEVIN DICK · CURRICULUM VITAE

INTERNATIONAL

Outstanding Performance Award - North America, IEEE EMBS 2019 International Recognition
 Outstanding Performance Award - Global, IEEE EMBS 2017 International Recognition
 Mitacs Globalink Research Grant, \$10,000 research grant for four month collaborative study of Plasmodium falciparum at the Indian Institute of Technology Bombay.

Mumbai, India

Presentations & Invited Talks

Invited Speaker - Agriculture & Agri-Foods Research and Analysis Directorate Retreat

Museum of Agriculture

AI/ML & ITS APPLICATIONS TO AGRICULTURE AND AGRI-FOODS CANADA

Dec. 4th 2018

- Described the history of classical and contemporary AI/ML methods.
- Emphasized the use of AI/ML in AAFC projects, both economical and biological prediction tasks.
- Recounted prior work on the designing peptides for Zika virus.

Invited Speaker - IEEE EMBS & OttBUGS Seminar Series

Carleton University

RECIPROCAL PERSPECTIVE FOR PROTEIN INTERACTION PREDICTION AND RELATED COMPLETE GRAPH PROBLEMS

Apr. 2018

• Elaborated upon the Reciprocal Perspective framework for protein-protein interaction prediction and its applicability to prediction problems which can be modeled as complete graphs.

ISC 2016 Conference Workshop for High School Students

Ottawa, Canada

"WELCOME TO THE WORLD OF BIOMEDICAL ENGINEERING"

May 2016

- Described the breadth of the field of biomedical engineering, motivating examples from on-going research areas based on individuals in the program.
- Promoted Carleton University as a leader in the field
- · Workshop was well received with several students and parents following-up with inquiries for additional information.

BIOM 5800 Seminar Series Ottawa. Canada

"INTERACTOME ANALYSIS OF MALARIA-CAUSING PARASITES AND THE ZIKA VIRUS"

February 2016

• Described two on-going research projects to graduate students and professors in the department.

Writing

Health Science Inquiry

www.healthscienceinquiry.com

NEWS REPORTER

Oct. 2017 - Present

- Wrote two articles on the topics of ongoing Health Science research in Canada and published in the annual publication.
- Article: "Artificial Intelligence and Mental Illness"
- Article: "The Best Way Forward: Simulations and Machine Learning for Optimizing Treatment

Infinity Institute www.infinityinstitute.ca

FOUNDER & WRITER Aug. 2017 - Present

- Wrote several articles on a broad range of topics for dissemination in the form of a digital magazine for the Canada-based Think Tank I founded.
- Article: "World View: Sampling the Opinion of the Global Population"

Hacking Health Ottawa, Canada

BLOGGER

Jan. 2017 - PRESENT

- Participated in events leading up to the Hackathon, drafted and published event recaps, and proof-read the work of other contributors.
- Article :: "Hacking Health Ottawa Hackathon 2017"
- Article :: "Healthcare Design Thinking Workshop"
- Article :: "Hacking Health Ottawa Pitch Clinic"
- Article :: "Hacking Health Ottawa Startup Successes in Healthcare"
- Article :: "IBM Bluemix Workshop (Part II)"
- Article :: "IBM Technology Innovation"
- Article :: "Silo-tions in Healthcare Panel"

The Making of a Mumbaikar

www.mumbaikar.chasingtheinfinite.com

Founder & Writer Sept. 2016 - Dec. 2016

· Captured my diverse experiences in the form of a blog while living in Mumbai, India during a four-month research project.

Professional Services _____

2019-Now **Executive Editor**, Health Science Inquiry

Nov. 2019 Associate Technical Co-Chair, Global Signal & Information Processing Conference - "Machine Learning for Rare Event Detection in Healthcare" Symposium

Ottawa, Canada

2019 **Reviewer**, Journal of Integrative Bioinformatics

2019 **Reviewer**, IEEE Transactions on Computational Biology and Bioinformatics

2019 **Reviewer**, IEEE Access

2018 Senior Editor & Layout Manager, Health Science Inquiry

2018-Now **Reviewer**, Proteomics

2018-2019 Reviewer, IEEE International Symposium on Medical Measurements and Applications (MeMeA)

2018 **Reviewer**, Archives Of Phytopathology and Plant Protection

2018 **Reviewer**, IEEE Life Sciences Conference 2018 (LSC)

Media

2020	The COVID19 Reseearch, Featured in the following article [LINK]	Ottawa, Canada
2020	The Coronavirus Kindness Project, Featured in the following [LINK 1], [LINK 2]	Global
2018	Q&A with Biomedical Engineering PhD student Kevin Dick , Featured story for the Faculty of Engineering and Design [LINK]	Ottawa, Canada
2018	Engineering a Data-Driven Health-Care Revolution, Featured story for the Faculty of Engineering	Ottowa Canada
	and Design [LINK]	Ottawa, Canada

Committees ______

2019	Associate Technical Committee Member , Global Signal & Information Processing Conference	Ottawa, Canada
2019	2019, Symposium Organizing Committee	
2017	Blogger, Hacking Health Ottawa Media & Publication Committee	Ottawa, Canada
2016	Member, Program Committee, International Student Conference 2016	Ottawa, Canada
2013	Member, SOAR Committee	Montreal, Canada

Hobbies _____

Sports Biking, Yoga, Hockey, Ballet, Swimming, Martial Arts

Music Piano, Guitar, Drums, Harmonica, Vocals

Art Doodling, Woodworking Projects, Poetry, Painting

Miscellaneous Knife-Making, DIY Projects, Cosplaying, Devouring Books