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## **Dr. Daniel Gaston**

Correspondence language: English

Sex: Male

Date of Birth: 1/21

Canadian Residency Status: Canadian Citizen

Country of Citizenship: Canada

## **Contact Information**

The primary information is denoted by (\*)

### **Address**

#### Primary Affiliation (\*)

Department of Pathology and Laboratory Medicine  
Division of Hematopathology  
Rm 511  
5788 University Ave  
Halifax Nova Scotia B3H 1V8  
Canada

### **Telephone**

Work (\*) 1-902-473-7219

### **Email**

Work (\*) dan.gaston@nshealth.ca  
Work daniel.gaston@dal.ca

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## Dr. Daniel Gaston

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### Language Skills

Language	Read	Write	Speak	Understand
English	Yes	Yes	Yes	Yes
French	No	No	No	No

### Degrees

2006/9 - 2012/9	<p>Doctorate, Doctor of Philosophy - Science, Biochemistry and Molecular Biology, Dalhousie University</p> <p>Degree Status: Completed</p> <p>Thesis Title: PHYLOGENOMIC APPROACHES TO THE ANALYSIS OF FUNCTIONAL DIVERGENCE AND SUBCELLULAR LOCALIZATION</p> <p>Transferred to PhD without completing Masters?: Yes</p> <p>Areas of Research: Bioinformatics</p> <p>Research Disciplines: Biology and Related Sciences</p> <p>Supervisors: Dr. Andrew J Roger</p>
2005/9 - 2006/6	<p>Diploma, Ontario College Bioinformatics Certificate, Bioinformatics, Seneca College for Applied Arts and Technology</p> <p>Degree Status: Completed</p>
2001/9 - 2005/5	<p>Bachelor's, Bachelor of Science, Biology-Chemistry, University of New Brunswick</p> <p>Degree Status: Completed</p>

### Recognitions

2012/10	<p>Oswald Avery Prize in Genetics - 400 (Canadian dollar)</p> <p>Dalhousie University</p> <p>Prize / Award</p> <p>Award for PhD work in Genetics</p>
2009/6	<p>SMBE 2009 Graduate Student Travel Award - 1,000</p> <p>Society for Molecular Biology and Evolution</p> <p>Distinction</p> <p>Travel award and contributed lecture. SMBE 2009</p>
2005/9 - 2006/9	<p>President's Honours List - 0</p> <p>Seneca College</p> <p>Distinction</p> <p>Academic Honour's List</p>

2004/9 - 2005/9      Dean's List - 0  
 University of New Brunswick  
 Distinction  
 Academic Dean's List

## User Profile

Researcher Status: Researcher  
 Research Career Start Date: 2015/06/16  
 Engaged in Clinical Research?: Yes

Key Theory / Methodology: Bioinformatics, Genomics, Big Data

Research Interests: Cancer Genomics, Bioinformatics software development, genomics visualization, big data analysis, genomics of rare mendelian disease, whole genome sequencing, exome sequencing, RNA-seq

Fields of Application: Biomedical Aspects of Human Health

Disciplines Trained In: Biology and Related Sciences, Computer Science

Technological Applications: Antibiotics, Bioactive molecules, Software

Areas of Research: Bioinformatics, Enzymes and Proteins, Evolution and Phylogenesis, Genotype and Phenotype, Macromolecules, Software (Tools)

Research Specialization Keywords: Bioinformatics, Cancer Genomics, Comparative Genomics, Functional Divergence, Genomics, Molecular Evolution, Phylogenetic Analysis, Protein Characterization, Protein Function, Protein Interactions, Protein Structure, Statistical Modeling

Research Disciplines: Computer Science, Genetics, Molecular Biology

## Employment

2015/7	Assistant Professor Pathology, Medicine, Dalhousie University Full-time, Assistant Professor Tenure Status: Non Tenure Track
2015/6	Clinical Laboratory Bioinformatician Pathology and Laboratory Medicine, Division of Hematopathology, Nova Scotia Health Authority Full-time, Assistant Professor Tenure Status: Non Tenure Track
2012/3 - 2015/6	Post-Doctoral Fellow Pathology, Medicine, Dalhousie University Full-time Tenure Status: Non Tenure Track Bioinformatics, IGNITE project. Developing methods for combining next-generation sequencing data with gene-centric information to prioritize and identify causal mutations in rare mendelian diseases.
2012/10 - 2013/8	Visting Scholar Pathology, Medicine, Stanford University Part-time Tenure Status: Non Tenure Track RNA-Seq data analysis, Bioinformatics, Cancer Genomics

2006/8 - 2012/2	Doctoral Student Biochemistry and Molecular Biology, Medicine, Dalhousie University Full-time Tenure Status: Non Tenure Track
2009/1 - 2009/4	Teaching Assistant Biochemistry and Molecular Biology, Medicine, Dalhousie University Part-time Tenure Status: Non Tenure Track
2008/1 - 2008/4	Teaching Assistant Biochemistry and Molecular Biology, Medicine, Dalhousie University Part-time Tenure Status: Non Tenure Track
2006/1 - 2006/5	Research Assistant - Volunteer Project Bioinformatics, York, Seneca College for Applied Arts and Technology Part-time Tenure Status: Non Tenure Track

## Affiliations

The primary affiliation is denoted by (\*)

(*) 2015/7	Assistant Profesor, Pathology, Dalhousie University
(*) 2015/6	Clinical Laboratory Bioinformatician, Pathology and Laboratory Medicine, Nova Scotia Health Authority
2012/3 - 2015/6	Post-Doctoral Fellow, Pathology, Dalhousie University
2012/10 - 2013/8	Visiting Scholar, Pathology, Stanford University RNA-Seq Analysis and Bioinformatics for Cancer Genomics
2006/8 - 2012/2	Doctoral Student, Biochemistry and Molecular Biology, Dalhousie University

## Research Funding History

### Awarded [n=3]

2015/11 - 2017/11 Principal Investigator	Next-Generation Sequencing Based Transcriptional Profiling of MAP3K6 Mutation Positive Gastric Cancer, Grant
	<b>Funding Sources:</b>
	2015/11 - 2016/11 Nova Scotia Health Authority Research Foundation Research Grants Total Funding - 15,000 (Canadian dollar) Funding Competitive?: Yes
2014/9 - 2015/6 Principal Applicant	Transcriptional profiling in Familial Gastric Cancer associated with mutations in MAP3K6, Fellowship
	<b>Funding Sources:</b>
	2014/9 - 2016/9 Beatrice Hunter Cancer Research Institute (BHCRI) Cancer Research Training Program - Post-Doctoral Fellowship Total Funding - 36,750 (Canadian dollar) Funding Competitive?: Yes

2014/9 - 2015/5  
Principal Applicant  
Detection and Discrimination of Vaccine-Preventable Serotypes of Streptococcus pneumoniae: Tackling the Limitations of PCR-Based Surveillance using next generation sequencing, Fellowship

**Funding Sources:**

2014/6 - 2015/5      CIRN  
Post-Doctoral Fellowship  
Total Funding - 22,000 (Canadian dollar)  
Funding Competitive?: Yes

Principal Investigator : Jason LeBlanc

**Completed [n=3]**

2014/9 - 2015/9  
Co-applicant  
Detection and Discrimination of Vaccine-Preventable Serotypes of Streptococcus pneumoniae: Tackling the Limitations of PCR-Based Surveillance using next generation sequencing, Grant

**Funding Sources:**

2014/11 - 2015/11    Capital Health Research Fund  
Research Grants  
Total Funding - 15,000 (Canadian dollar)  
Funding Competitive?: Yes

Principal Investigator : Jason LeBlanc

2012/10 - 2012/11  
Principal Applicant  
RNA-Seq techniques and data analysis for Cancer Genomics, Grant  
Clinical Research Project?: No  
Project Description: Travel to lab of Dr. Stephen Montgomery to learn techniques for generating RNA sequencing libraries and RNA-Seq data analysis techniques. Developing and gaining familiarity with in-house software tools/libraries. Analyze RNA-Seq data from cancer samples

**Funding Sources:**

2012/10 - 2012/11    Beatrice Hunter Cancer Research Institute (BHCRI)  
CRTP Skills Acquisition Program  
Total Funding - 2,500 (Canadian dollar)  
Funding Renewable?: No  
Funding Competitive?: Yes

2010/9 - 2011/9  
Principal Applicant  
Phylogenetic Characterization of Protein Function, Fellowship  
Clinical Research Project?: No

**Funding Sources:**

2010/9 - 2011/9      Nova Scotia Health Research Foundation (NSHRF)  
Graduate Student Fellowship  
Total Funding - 19,030 (Canadian dollar)  
Funding Competitive?: Yes

Principal Investigator : Andrew Roger

**Under Review [n=2]**

2017/9 - 2022/9  
Co-applicant  
Clinical and genetic factors in response to lithium in bipolar disorder

**Funding Sources:**

Canadian Institutes of Health Research (CIHR)  
 Project Grant  
 Total Funding - 1,165,000  
 Funding Competitive?: Yes

2017/9 - 2020/9  
 Principal Investigator Understanding the impact of functional divergence on the propensity for duplicated genes to underlie Mendelian disease

**Funding Sources:**

Canadian Institutes of Health Research (CIHR)  
 Project Grant  
 Total Funding - 100,000  
 Funding Competitive?: Yes

**Student/Postdoctoral Supervision****Bachelor's [n=1]**

2016/4 - 2016/9  
 Co-Supervisor Katya Radan (In Progress) , Saint Mary's University  
 Student Degree Start Date: 2012/9  
 Thesis/Project Title: Applications of Functional Divergence Analysis to Phylogenomics  
 Project Description: Accounting for Functional Divergence in Phylogenomic analyses of Eukaryotic origins  
 Present Position: Summer Student

**Bachelor's Honours [n=1]**

2016/9 - 2017/5  
 Principal Supervisor Katya Radan (In Progress) , Saint Mary's University  
 Student Degree Start Date: 2012/9  
 Thesis/Project Title: Applications of Functional Divergence Analysis to Mendelian Disease  
 Project Description: Functional divergence and human disease genes. Accounting for functional divergence is hypothesised to improve phylogenetically based predictions of pathogenic variants in genomic data. In addition, we expect predictions of functionally divergent sites to correlate with sites important in the disease process.  
 Present Position: Honour's Student

**Journal Review Activities**

Reviewer, PLoS ONE  
 Number of Works Reviewed / Refereed: 3

Reviewer, Biology Direct  
 Number of Works Reviewed / Refereed: 1

Reviewer, Molecular Biology and Evolution  
 Number of Works Reviewed / Refereed: 3

Reviewer, Amino Acids  
 Number of Works Reviewed / Refereed: 1

2013/5  
 Format Reviewer, Antioxidants & Redox Signaling  
 Number of Works Reviewed / Refereed: 1

## Research Funding Application Assessment Activities

Committee Member, Beatrice Hunter Cancer Research Institute Summer Studentship,  
Funder, Academic Reviewer

Scientific Officer, Beatrice Hunter Cancer Research Institute Graduate Student and Post-  
Doctoral Fellowship Awards, Funder, Academic Reviewer

## Event Participation

Lightning Talk, iEvoBio, Conference, 2010/6 - 2010/6

Poster, Society for Molecular Biology and Evolution Annual Meeting, Conference, 2012/6 -  
2012/6

Poster, Evolution, Conference, 2010/6 - 2010/6

Speaker, Society for Molecular Biology and Evolution Annual Meeting, Conference,  
2009/6 - 2009/6

## Presentations

1. Drs. Zhaolin Xu and Micheal Johnstone. (2017). Next-Generation Sequencing and Genomic Medicine in Lung Cancer. BHCRI Integrated Learning Session, Canada  
Main Audience: Researcher  
Invited?: Yes, Keynote?: No
2. (2014). Germline Mutations in MAP3K6 Predispose to Gastric Cancer. European Society for Human Genetics. European Society of Human Genetics, Milan, Italy  
Main Audience: Researcher  
Invited?: No, Keynote?: No
3. (2014). Mutations in MAP3K6 are Associated with Familial Gastric Cancer. Department of Pathology Research Day, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
4. (2014). Mutations in MAP3K6 predispose to familial gastric cancer: the power, promise and pitfalls of genomics in understanding genetic disease. Department of Pathology Grand Rounds, Halifax, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No
5. (2013). Black Magic and Bioinformatics:<?> Discovering Causal Genetic Variants With Next-Gen Sequencing. Pathology Departmental Seminar, Dalhousie University, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
6. (2013). Next-Gen Sequencing, Systems Biology, and the Data Deluge: Identifying Causative Genes of Rare Diseases in the Post-Genomics Era. Mount Saint Vincent University Biology Department Seminar Series, Halifax, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No

7. (2013). Pitfalls and Prioritization: The importance of data visualization, pluralistic analyses, and data integration to next-generation sequencing data for human disease genetics. Pathology Research Day, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Poster Presentation
8. (2013). Genetic Diseases, Bioinformatics, and Pathology. Pathology Residents Molecular Diagnostics Rotation, Capital District Health Authority, Halifax, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No, Competitive?: No  
Description / Contribution Value: An introduction to the current and future role of next-generation sequencing and bioinformatics in the practice of Pathology. The focus was on the use of next-generation sequencing for diagnosing genetic diseases.
9. (2012). Next-Gen Sequencing, Systems Biology, and the Data Deluge: Identifying Causative Genes of Rare Diseases in the Post-Genomics Era. Dalhousie Postdoctoral Fellows Research Day, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
10. (2012). Bioinformatics in Genetics Research. Genetics Noon Symposium Series, Halifax, Canada  
Main Audience: Knowledge User  
Invited?: Yes, Keynote?: No
11. (2012). Bioinformatics: Intro to RNA-Seq Analysis. CRTP Workshop, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No
12. (2012). Next-Gen Sequencing, Systems Biology, and the Data Deluge: Identifying Causative Genes of Rare Diseases in the Post-Genomics Era. Dalhousie Pathology Department Research Day, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Presentation
13. (2012). Next-Gen Sequencing, Systems Biology, and the Data Deluge: Identifying Causative Genes of Rare Diseases in the Post-Genomics Era. Post-Doctoral Research Day, Dalhousie University, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Poster
14. (2012). Functional divergence and convergent evolution in glyceraldehyde-3-phosphate dehydrogenases of Archeplastida and Chromalveolata. Society for Molecular Biology and Evolution, Dublin, Ireland  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Poster
15. (2010). Evaluating the performance of Functional Divergence prediction methods in protein evolution. iEvoBio, Portland, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Lightning Talk
16. (2010). Comparative BLAST for Organelles. Evolution, Portland, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Poster



17. (2009). A Likelihood Based Mixture Model Method of Identifying Functionally Divergent Protein Residues. Canadian Institute for Advanced Research Microbial Diversity Program, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: No  
Description / Contribution Value: Poster
18. (2009). FunDi: A Phylogenetic Mixture-Model Approach to Predicting Functionally Divergent Protein Residues. Society for Molecular Biology and Evolution, Iowa City, United States  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Talk
19. (2008). A Likelihood Based Mixture Model Method of Identifying Functionally Divergent Protein Residues. Protist, Halifax, Canada  
Main Audience: Researcher  
Invited?: No, Keynote?: No, Competitive?: Yes  
Description / Contribution Value: Poster

## Broadcast Interviews

- 2015/10/27      Unlocking genetic secrets: Next-Generation Sequencing and Molecular Diagnostics, Live at 5, House calls, CTV Atlantic

## Publications

### Journal Articles

1. Salsman J, Stathakis A, Parker E, Chung D, Anthes LE, Koskowich KL, Lahsae S, Gaston D, Kukurba KR, Smith KS, Chute IC, Léger D, Frost LD, Montgomery SB, Lewis SM, Eskiw C, Dellaire G. (2017). PML nuclear bodies contribute to the basal expression of the mTOR inhibitor DDIT4. *Scientific Reports*. 7(45038): 45038.  
Co-Author  
In Press  
Refereed?: Yes  
Number of Contributors: 17
2. Fernandez-Murray JP, Prykhozhij SV, Dufay JN, Steele S, Gaston D, Nasrallah G, Coombs A, Liwski R, Fernandez C, Berman J, McMaster C. (2016). Glycine and Folate Ameliorate Congenital Sideroblastic Anemia. *PLoS Genetics*. 0: 0.  
Co-Author  
Accepted,  
Refereed?: Yes, Open Access?: Yes  
Number of Contributors: 11
3. Prykhozhij SV, Rajan V, Gaston D, Berman JN. (2015). CRISPR MultiTargeter: a web tool to find common and unique CRISPR single guide RNA targets in a set of similar sequences. *PLoS ONE*. 10(3): e0119372.  
Co-Author  
Accepted,  
Refereed?: Yes

4. Gaston D, Hansford S, Oliveira C, Nightingale M, Pinheiro H, Macgillivray C, Kaurah P, Rideout A, Steele P, Soares G, Huang WY, Whitehouse S, Blowers S, LeBlanc MA, Jiang H, Greer W, Samuels M, Orr A, Fernandez CV, Ludman M, Penney L, McMaster CR, Huntsman D, Bedard K.(2014). Germline mutations in MAP3K6 are associated with familial gastric cancer. PLoS Genetics. 10(10): e1004669.  
First Listed Author  
Published,  
Refereed?: Yes  
Number of Contributors: 24
5. Tsaousis AD, Gentekaki E, Eme L, Gaston D, Roger AJ. (2014). Evolution of the Cytosolic Iron-Sulfur Cluster Assembly Machinery in Blastocystis Species and Other Microbial Eukaryotes. Eukaryotic Cell. 13(1): 143-153.  
Co-Author  
Published,  
Refereed?: Yes  
Number of Contributors: 5
6. Robitaille JM, Gillett RM, Leblanc M, Gaston D, Nightingale M, Mackley MP, Parkash S, Hathaway J, Thomas A, Ells A, Trabouls E, Héon E, Roy M, Shalev S, Fernandez C, MacGillivray C, Wallace K, McMaster CR, Bedard K. (2014). Phenotypic Overlap Between Familial Exudative Vitreoretinopathy (FEVR) and Microcephaly Lymphedema Chorioretinal Dysplasia (MLCRD) Caused by KIF11 Mutations.JAMA Ophthalmology. 132(12): 1393-1399.  
Co-Author  
Published,  
Refereed?: Yes  
Number of Contributors: 19
7. Venkatesh J, Yu JW, Gaston D, Park SW. (2014). Molecular evolution and functional divergence of X-intrinsic protein genes in plants. Molecular Genetics and Genomics. 290(2): 443-460.  
Co-Author  
Published,  
Refereed?: Yes
- [8.](#) Leblanc MA, Penney LS, Gaston D, Shi Y, Aberg E, Nightingale M, Jiang H, Gillett RM, Fahiminiya S, Macgillivray C, Wood EP, Acott PD, Khan MN, Samuels ME, Majewski J, Orr A, McMaster CR, Bedard K.(2013). A novel rearrangement of occludin causes brain calcification and renal dysfunction. Human Genetics. 132(11): 1223-1234.  
Co-Author  
Published,  
Refereed?: Yes, Open Access?: No  
Number of Contributors: 18  
Description / Contribution Value: Second author, bioinformatic analyses, short-read mapping, variant calling, gene prioritization, homozygosity mapping
- [9.](#) Gaston D and Roger AJ. (2013). Functional Divergence and Convergent Evolution in the Plastid-Targeted Glyceraldehyde-3-Phosphate Dehydrogenases of Diverse Eukaryotic Algae. PLoS ONE. 8(7): e70396.  
First Listed Editor  
Published, PLoS,  
Refereed?: Yes, Open Access?: Yes  
Number of Contributors: 2  
Description / Contribution Value: An analysis of functional divergent and convergent evolution in the plastid-targeted GAPDH sequence, of different origins,s of diverse eukaryotic algae.

10. Tsaousis AD, Ollagnier de Choudens S, Gentekaki E, Long S, Gaston D, Stechmann A, Vinella D, Py B, Fontecave M, Barras F, Lukes J, Roger AJ.(2012). Evolution of Fe/S cluster biogenesis in the anaerobic parasite *Blastocystis*. *Proceedings of the National Academy of Sciences USA*. 109(26): 10426-10431.  
Co-Author  
Published,  
Refereed?: Yes, Open Access?: No  
Number of Contributors: 12  
Description / Contribution Value: Phylogenetic analysis, alignment, structural analysis, bioinformatic analysis
11. Tsaousis AD , Gaston D , Stechmann A , Walker PB , Lithgow T , Roger AJ. (2011). A functional Tom70 in the human parasite *Blastocystis* sp.: implications for the evolution of the mitochondrial import apparatus. *Molecular biology and evolution*. 28(1): 781-791.  
Co-Author  
Published,  
Refereed?: Yes
12. Gaston D , Susko E , Roger AJ. (2011). A phylogenetic mixture model for the identification of functionally divergent protein residues. *Bioinformatics (Oxford, England)*. 27(19): 2655-2663.  
First Listed Author  
Published,  
Refereed?: Yes
13. Gaston D , Tsaousis AD , Roger AJ. (2009). Predicting proteomes of mitochondria and related organelles from genomic and expressed sequence tag data. *Methods in enzymology*. 457: 21-47.  
Published,  
Refereed?: Yes, Open Access?: No
14. Stechmann A , Hamblin K , Pérez-Brocail V , Gaston D , Richmond GS , van der Giezen M , Clark CG , Roger AJ. (2008). Organelles in *Blastocystis* that blur the distinction between mitochondria and hydrogenosomes. *Current biology : CB*. 18(8),
15. Gill EE, Diaz-Triviño S, Barberà MJ, Silberman JD, Stechmann A, Gaston D, Tamas I, Roger AJ. (2007). Novel mitochondrion-related organelles in the anaerobic amoeba *Mastigamoeba balamuthi*. *Molecular Microbiology*. 66(6): 1306-1320.  
Co-Author  
Published,  
Refereed?: Yes

## Book Chapters

1. Gaston D and Giacomantonio C. (2014). *Genomics of Colorectal Cancer*. Dellaire G, Berman J, and Arceci R. *Cancer Genomics*.  
First Listed Author  
In Press, Elsevier, United Kingdom  
Refereed?: No  
Number of Contributors: 2

## Dissertations

1. PHYLOGENOMIC APPROACHES TO THE ANALYSIS OF FUNCTIONAL DIVERGENCE AND SUBCELLULAR LOCALIZATION. (2012). Dalhousie University. Doctorate.  
Number of Pages: 238  
Funding Sources: Nova Scotia Health Research Foundation (NSHRF) - NA