

Curriculum Vitæ

SAHIR RAI BHATNAGAR

A. HIGHLIGHTS

- NSERC Discovery Grant with Discovery Launch Supplement (2020 – 2026).
- Co-Investigator and Lead Biostatistician on two CIHR Project Grants (2020–2022 and 2021–2026).
- Graduated 1 Masters + 1 PhD, and currently supervising 4 PhD + 2 Master + 4 Undergraduate students, within the first 3 years of my faculty appointment.
- Senior (or co-senior) author on 4 submitted + 2 published articles where my student is the first (or co-first) author.
- Led the development of an online, 15-credit certificate in Health Data Analytics at McGill.
- Author of 7 R packages published on CRAN with over 100k downloads.
- International collaboration with researchers in the UK led to the publication of a paper in Nature Genetics which has been cited 150 times since 2019

B. DATE OF PREPARATION

October 19, 2021

C. BIOGRAPHICAL INFORMATION

Address	Department of Epidemiology, Biostatistics, and Occupational Health McGill University Purvis Hall, Room 37 1020 Pine Avenue West, Montréal (QC), Canada H3A 1A2
Work phone	514-398-2711
E-mail	sahir.bhatnagar@mcgill.ca
Homepage	https://sahirbhatnagar.com/
Citizenship	Canada
Languages	English, French, Hindi

D. EDUCATION

2013–2018	Ph.D. (Biostatistics) McGill University, Montreal QC, Canada <i>Thesis:</i> Penalized regression methods for interaction and mixed-effects models with applications to genomic and brain imaging data <i>Advisors:</i> Dr. Celia Greenwood and Dr. Yi Yang Queen Elizabeth Scholar
2012–2013	Master of Science (Biostatistics) Queen's University, Kingston ON, Canada <i>Thesis:</i> Absolute risk estimation in a case cohort study of prostate cancer <i>Advisors:</i> Dr. Paul Peng and Dr. Devon Lin <i>Committee Members:</i> Dr. Dongsheng Tu and Dr. Wenyu Jiang
2011	Associate of the Society of Actuaries
2005–2008	Bachelor of Science (Actuarial Mathematics) Concordia University, Montreal QC, Canada

E. RESEARCH INTERESTS

Dimension reduction for predictive models, high-dimensional statistical inference, penalized regression, interaction selection, actuarial statistics, statistical genetics

F. APPOINTMENTS

July 1, 2018	Assistant Professor, McGill University Department of Epidemiology, Biostatistics and Occupational Health Department of Diagnostic Radiology
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G. AWARDS

2017	UK Genetics Society Training Grant £1,000
2016	McGill University and Genome Quebec Innovation Centre (MUGQIC) Travel Award \$1,000
2016	Graduate Research Enhancement and Travel (GREAT) Award \$1,000
2016	Quantitative Biology and Medical Genetics for the World Queen Elizabeth II Scholarship \$6,000
2016	Best Student Oral Presentation - 28th International Biometric Society Meeting
2016	SSC Biostatistics Section Travel Award \$250
2015	Best Poster Presentation - 4th Annual Canadian Human and Statistical Genetics Meeting \$1,000
2014	Genetic Analysis Workshop 19 Travel Award \$1,000
2013	McGill Graduate Excellence Award \$18,000
2012	MSc Queen's Graduate Studies Award \$20,000

H. GRANTS SUBMITTED (Awarded in Red)

2021

1. **CIHR Project Grant (Co-I):** High-Resolution Spatiotemporal Variations in Urban Air Temperatures and Emergency Room Visits for Cardiorespiratory Morbidity and Mental Health Outcomes (PIs: Scott Weichenthal, Eric Lavigne, Alexandra Schmidt). Total: \$761,176.
2. **Compute Canada Resources for Research Groups (PI):** Statistical methods to analyze high-dimensional data (5 GPU years, 193 Core years, 120 TB project storage, 180 TB near-line storage). Total: \$46,812.
3. **McGill Initiative in Computational Medicine ResearchMatch Program (Co-PI):** Prediction of chronic pain trajectories in the aging population using genetic data. (PIs: Sahir Bhatnagar, Audrey Grant).
4. **CIHR Project Grant (Co-I):** Leveraging high-volume data to characterize age and individual-specific vital signs and to develop novel geriatric vital signs that optimally predict clinical outcomes in older adults (PI: Quoc Nguyen).
5. **CIHR Project Grant (Co-I):** The OPERa Study: A Multicenter Observational Prospective Cohort Study to Evaluate Determinants of Long-Term Quality of Life following Restorative Proctectomy for Rectal Cancer Treatment (PI: Marylise Boutros).
6. **CANSSI Collaborative Research Training Grant (Co-I):** Improving robust high-dimensional causal inference and prediction modelling. (PIs: Gabriela Cohen Freue, Celia MT Greenwood). Total: \$199,600.

2020

1. **CIHR Project Grant (Co-I):** Evaluating the Trajectory of Aortic Stenosis (AS) in Quebec patients - Diagnosis, Treatments, and Outcomes. (PI: James Brophy). Total: \$229,500.
2. **NSERC Discovery Grant with Discovery Launch Supplement (PI):** Variable Selection and Prediction for High-Dimensional Genetic Data with Complex Structures. Total: \$120,000.
3. **FRSQ Recherches en Radiologie (Co-I):** Stratification quantitative et qualitative du risque de malignité sur tomodensitométrie (TDM) des lésions kystiques complexes. (PI: Caroline Reinhold). Total: \$63,500.

2019

1. **Mitacs Accelerate (PI):** Machine Learning to Predict Temporomandibular Disorders Risk from Genotypes. Total: \$106,667.
2. **FRQNT Établissement de la relève professorale (PI):** Avances dans les modèles mixtes pour la prévision et la sélection des variables dans les données de grande dimension.
3. **CIHR Project Grant (Co-I):** Evaluating the Trajectory of Aortic Stenosis (AS) Treatments, Outcomes and Cost-Effectiveness in Quebec patients.
4. **Heart and Stroke Foundation GIA competition (Co-I):** Evaluating the Trajectory of Aortic Stenosis (AS) Treatments, Outcomes and Cost-Effectiveness in Quebec patients.

5. **McGill Initiative in Computational Medicine ResearchMatch Program (Co-PI):** Genomewide Mega-Analysis of high quality phenotyped cohorts of temporomandibular disorders. (Co-PI: Luda Diatchenko). Total: \$50,000.
6. **SSHRC New Frontiers in Research Fund (Co-PI):** Exploring the Use of Deep Learning Image Analysis in Environmental Health at the Patient and Population Level.
7. **CIHR Project Grant (Co-I):** Predicting High-Resolution Spatial and Temporal Variations in Summertime Air Temperatures to Support Public Health Interventions During Heat Emergencies.

2018

1. **Rossy Cancer Network Cancer Quality & Innovation Research Grant (Co-I):** Impact of a Patient-Centered Program for Low Anterior Resection Syndrome: a Multicenter Randomized Controlled Trial. (PI: Richard Garfinkle). Total: \$96,404.
2. **Canadian Society of Colon and Rectal Surgeons (CSCRS) (Co-I):** Impact of a Patient-Centered Program for Low Anterior Resection Syndrome: a Multicenter Randomized Controlled Trial. (PI: Richard Garfinkle). Total: \$35,000.
3. **Rossy Cancer Network Research Fund (Co-I):** Radiogenomic models with artificial intelligence for detection of nodal micrometastases to reduce unnecessary neck dissections in head and neck cancer patients. (PI: Reza Forghani). Total: \$100,000.
4. **McGill University Research Allowance (PI, start-up funds, non-peer reviewed).** Total: \$20,000.
5. **NVIDIA GPU Grant Program (PI):** Accelerating computation in high-dimensional penalized regression models. Total: 1 Titan XP GPU.

I. PUBLICATIONS

authors in bold indicate my trainees

Methodological and Statistical Papers

I.1 PREPRINTS

1. Genest C, Hanley JA, Bhatnagar SR (2021+). How many in my class are vaccinated ? *Submitted to Journal of Statistics and Data Science Education*.
2. **Her P**, Saeed S, Tram K, Bhatnagar SR (2021+). Can tracking mobility be used as a public health tool against COVID-19 following the expiration of stay-at-home mandates? *Submitted to Scientific Reports*.
3. Genest C, Hanley JA, Bhatnagar SR (2021+). Combien de gens sont vaccinés dans mon groupe ? *Submitted to Bulletin Association mathématique du Québec (AMQ)*.
4. Golchi S, **Fu J**, Liu X, Yu E, Forghani R, Bhatnagar SR (2021+). Sparse Bayesian Predictive Modelling of Tumor Response Using Radiomic Features. *Submitted to Stat*.

5. Hanley JA, Bhatnagar SR (2021+). The Poisson Distribution: Origins, Reenactments, and Prospects. *In revision at The American Statistician*.
6. **Bian Z**, Moodie EEM, Shortreed S, Bhatnagar SR (2021+). Variable Selection in Regression-based Estimation of Dynamic Treatment Regimes. <https://arxiv.org/abs/2101.07359>. *Revision submitted at Biometrics*.
7. **Yang K**, Asgharian M, Bhatnagar SR (2021+). Improving Rate of Convergence for Non-convex Composite Programming. <https://arxiv.org/abs/2009.10629>. *Submitted to Optimization Letters*.
8. Bhatnagar SR, Turgeon M, **Islam J**, Hanley JA, Saarela O (2021+). casebase: An Alternative Framework For Survival Analysis and Comparison of Event Rates. <https://arxiv.org/abs/2009.10264>. *Revision submitted at R Journal*.
9. Bhatnagar, SR, Lu, T, Lovato, A, Olds, DL, Kobor, MS, Meaney, MJ, O'Donnell, K, Yang, Y, and Greenwood, CMT (2021+). A Sparse Additive Model for High-Dimensional Interactions with an Exposure Variable. bioRxiv. DOI 10.1101/445304. *Revision submitted at Computational Statistics and Data Analysis*.

I.2 PUBLISHED ARTICLES

10. Savadjiev P, Gallix B, Rezanejad M, Bhatnagar SR, Semionov A, Siddiqi K, Forghani R, Reinhold C, Eidelman D, Dandurand R (2021+). Mean curvature of isophotes: improved disease detection in chest CT. *In press at Radiology: Artificial Intelligence*.
11. Escribe C, Lu T, Keller-Baruch J, Forgetta V, Xiao B, Richards JB, Bhatnagar SR, Oualkacha K, Greenwood CMT (2021+). Block coordinate descent algorithm improves variable selection and estimation in error-in-variables regression. *In press at Genetic Epidemiology*.
12. Forgetta V, Keller-Baruch J, Forest M, Durand A, Bhatnagar SR, Kemp JP, Nethander M, Evans D, Morris JA, Kiel DP, Rivadeneira F, Johansson H, Harvey NC, Mellström D, Karlsson M, Cooper C, Evans DM, Clarke R, Kanis JA, Orwoll E, McCloskey EV, Ohlsson C, Pineau J, Leslie WD, Greenwood CMT, Richards JB (2020). Development of a polygenic risk score to improve screening for fracture risk: A genetic risk prediction study. *Plos Medicine*. DOI 10.1371/journal.pmed.1003152
13. Bhatnagar SR, Yang Y, Lu T, Schurr E, Loredó-Osti JC, Forest M, Oualkacha K, Greenwood CMT (2020). Simultaneous SNP selection and adjustment for population structure in high dimensional prediction models. *PLoS Genetics* 16(5): e1008766. DOI 10.1371/journal.pgen.1008766.
14. Bhatnagar SR, Yang Y, Khundrakpam B, Evans A, Blanchette M, Bouchard L, Greenwood CMT (2017). An analytic approach for interpretable predictive models in high dimensional data, in the presence of interactions with exposures. *Genetic Epidemiology*. Apr 1;42(3):233-49. DOI 10.1101/102475.
15. Klein Oros K, Oualkacha K, Lafond M, Bhatnagar SR, Tonin PN, Greenwood CMT (2016). Gene coexpression analyses differentiate networks associated with diverse cancers harbouring TP53 missense or null mutations. *Frontiers in Genetics, section Statistical Genetics and Methodology*. Aug 3;7:137. DOI 10.3389/fgene.2016.00137.

16. Bhatnagar SR, Greenwood CMT, Labbe A (2016). Assessing transmission ratio distortion in extended families: a comparison of analysis methods. *BMC Proceedings*. 2016, 10(Suppl 7):12. DOI [10.1186/s12919-016-0030-0](https://doi.org/10.1186/s12919-016-0030-0).
17. Sun J., Bhatnagar SR, Oualkacha K, Ciampi A, Greenwood CMT (2016) Joint analysis of multiple blood pressure phenotypes in GAW19 data by using a multivariate rare-variant association test. *BMC Proceedings*. 2016, 10(Suppl 7):14. DOI [10.1186/s12919-016-0048-3](https://doi.org/10.1186/s12919-016-0048-3).
18. Wang Y, Murphy O, Turgeon M, Wang ZY, Bhatnagar SR, Schulz J, and Moodie EEM (2015) The perils of Quasi-likelihood Information Criteria. *Stat.* Feb 1;4(1):246-54. DOI: [10.1002/sta4.95](https://doi.org/10.1002/sta4.95).
19. Bhatnagar SR, Atherton J, Benedetti A (2015). Comparing alternating logistic regressions to other approaches to modelling correlated binary data. *Journal of Statistical Computation and Simulation*. Jul 3;85(10):2059-71. DOI [10.1080/00949655.2014.916707](https://doi.org/10.1080/00949655.2014.916707).

Substantive Papers

1.3 PREPRINTS

20. Dana J, Lefebvre T, Savadjiev P, Bodard S, Bhatnagar SR, Forghani R, H  l  non O, Reinhold C (2021+). Malignancy Risk Stratification of Cystic Renal Lesions Based on a Contrast-Enhanced CT-based Machine Learning Model and a Clinical Decision Algorithm.
21. Sivakumaran L, Alturkistani H, Lerouge S, Bertrand-Grenier A, Zehtabi F, Th  rass     , Roy-Cardinal M, Bhatnagar SR, Cloutier G, Soulez G (2021+). Strain Ultrasound Elastography of Aneurysm Sac Content after Randomized Endoleak Embolization with Sclerosing and Non-sclerosing Chitosan-based Hydrogels in a Canine Model.

1.4 PUBLISHED ARTICLES

22. Liu X, Maleki F, Muthukrishnan N, Ovens K, Huang S, Pérez-Lara A, Romero-Sanchez G, Bhatnagar SR, Chatterjee A, Pusztaszeri MP, Spatz A, Batist G, Payabvash S, Haider SP, Mahajan A, Reinhold C, Forghani B, O'Sullivan B, Yu E, Forghani R (2021). Site-specific variation in radiomic features of head and neck squamous cell carcinoma and its impact on machine learning models. *Cancers*. 3(15), 3723.
23. Lu T, Forgetta V, Keller-Baruch J, Nethander M, Bennett D, Forest M, Bhatnagar S, Walters RG, Lin K, Chen Z, Li L. Improved prediction of fracture risk leveraging a genome-wide polygenic risk score (2021). *Genome Medicine*. Dec;13(1):1-5.
24. **Wu H**, Forgetta V, Zhou S, Bhatnagar SR, Paré G and Richards JB (2020). A Polygenic Risk Score for Low-density Lipoprotein Cholesterol is Associated with Risk of Ischemic Heart Disease and Enriches for Individuals with Familial Hypercholesterolemia. *Circulation: Genomic and Precision Medicine*.
25. Anderson-Trocme and Bhatnagar SR. Visualizing the Covid-19 pandemic with doubling rates (2020). *Significance*. <https://www.significancemagazine.com/science/676-visualizing-the-covid-19-pandemic-with-doubling-rates>
26. Gorelik N, Patil K, Chen SJ, Bhatnagar SR, Faingold R (2020). Impact of Simulation Training on Radiology Resident Performance in Neonatal Head Ultrasound. *Academic Radiology*. DOI 10.1016/j.acra.2020.06.040

27. **Garfinkle R**, Loisel CG, Park J, Fiore Jr JF, Bordeianou LG, Liberman AS, Morin N, Faria J, Ghitulescu G, Vasilevsky C, Bhatnagar SR, Boutros M (2020). Development and evaluation of a patient-centred program for low anterior resection syndrome: protocol for a randomized controlled trial. *BMJ Open*. 10:e035587. DOI [10.1136/bmjopen-2019-035587](https://doi.org/10.1136/bmjopen-2019-035587).
28. **Garfinkle R**, Filion KB, Bhatnagar SR, Sigler G, Banks A, Letarte F, Liberman S, Brown CJ, Boutros M (2019). Prediction model and webbased risk calculator for postoperative ileus after loop ileostomy closure. *British Journal of Surgery*. DOI [10.1002/bjs.11235](https://doi.org/10.1002/bjs.11235).
29. Khalil MA, Bhatnagar SR, Feldman L, Longtin Y, Vasilevsky CA, Carignan A, Morin N, Boutros M (2019). Development and validation of a clinical risk calculator for mortality after colectomy for fulminant *Clostridium difficile* colitis. *Journal of Trauma and Acute Care Surgery*. DOI [10.1097/TA.0000000000002412](https://doi.org/10.1097/TA.0000000000002412)
30. Kronfli N, Bhatnagar SR, Hull MW, Moodie EE, Cox J, Walmsley S, Gill J, Cooper C, Martel-Laferrrière V, Pick N, Klein MB (2019). Trends in cause-specific mortality in HIV/hepatitis C coinfection following hepatitis C treatment scale-up. *AIDS (London, England)*. May 1;33(6):1013. DOI [10.1097/QAD.0000000000002156](https://doi.org/10.1097/QAD.0000000000002156).
31. **Garfinkle R**, Wong-Chong N, Petrucci A, Sylla P, Wexner S, Bhatnagar S, Morin N, Boutros M (2019). Assessing the readability, quality and accuracy of online health information for patients with Low Anterior Resection Syndrome following surgery for rectal cancer. *Colorectal Disease*. DOI [10.1111/codi.14548](https://doi.org/10.1111/codi.14548).
32. Hatzikotoulas K, Tachmazidou I, Southam L, Esparza-Gordillo J, Haberland V, Zheng J, Johnson T, Koprulu M, Zengini E, Steinberg J, Wilkinson J, Bhatnagar SR, [...], Zeggini E (2019). Genome-wide analyses using UK biobank data provide new therapeutic targets for osteoarthritis. *Osteoarthritis and Cartilage*. Apr 1;27:S58-9. DOI [10.1016/j.joca.2019.02.083](https://doi.org/10.1016/j.joca.2019.02.083)
33. **Garfinkle R**, Abou-Khalil M, Bhatnagar S, Wong-Chong N, Azoulay L, Morin N, Vasilevsky C, Boutros M (2019). A Comparison of Pathologic Outcomes of Open, Laparoscopic, and Robotic Resections for Rectal Cancer Using the ACS-NSQIP Proctectomy-Targeted Database: a Propensity Score Analysis. *Journal of Gastrointestinal Surgery*. 23:348356. DOI [s11605-018-3974-8](https://doi.org/10.1007/s11605-018-3974-8).
34. Tachmazidou I, Hatzikotoulas K, Southam L, Esparza-Gordillo J, Haberland V, Zheng J, Johnson T, Koprulu M, Zengini E, Steinberg J, Wilkinson J, Bhatnagar S, Hoffman JD, Buchan N, Süveges D, Yerges-Armstrong L, Davey Smith G, Gaunt TR, Scott RA, McCarthy LC, Zeggini E (2019). Identification of new therapeutic targets for osteoarthritis through genome-wide analyses of UK Biobank. *Nature Genetics*. 51, pages 230236. DOI [10.1038/s41588-018-0327-1](https://doi.org/10.1038/s41588-018-0327-1).
35. Nadig A, Flanagan T, White K, Bhatnagar SR (2018). Results of a RCT on a transition support program for adults with ASD: Effects on Self Determination and Quality of Life (2018). *Autism Research*. 11 (12), 1712-1728. DOI [10.1002/aur.2027](https://doi.org/10.1002/aur.2027).
36. Delouya G, Tiberi D, Bhatnagar S, Campeau S, Saad F, Taussky D. (2018). Impact of adipose tissue on prostate cancer aggressivenessanalysis of a high-risk population. *Hormone molecular biology and clinical investigation*. 36(3). DOI [10.1515/hmbci-2018-0049](https://doi.org/10.1515/hmbci-2018-0049).

37. Steinberg J, Brooks R, Southam L, Bhatnagar SR, Roumeliotis T, Hatzikotoulas K, Zengini E, Wilkinson JM, Choudhary J, McCaskie AW, Zeggini E (2018). Widespread Epigenomic, Transcriptomic and Proteomic Differences Between Hip Osteophytic and Articular Chondrocytes in Osteoarthritis. *Rheumatology*. 57(8): 1481-1489. DOI [10.1093/rheumatology/key101](https://doi.org/10.1093/rheumatology/key101).

J. PRESENTATIONS AND LECTURES

*indicates the person that gave the presentation

authors in bold indicate my trainees

J.1 KEYNOTE ADDRESSES

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| 2019/03/15 | Miser sur la sparsité . Sommet étudiant de la statistique à Montréal. UQAM. |
| 2018/03/16 | Pick your favorite buzzword: Data Science, Big Data, Machine Learning, Data Science, Big Data, Machine Learning . 14th Annual McGill Epidemiology, Biostatistics and Occupational Health Research Day. |

J.2 PRESENTATIONS AT UNIVERSITIES OR RESEARCH INSTITUTES (INVITED)

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| 2021/07/12 | Variable selection for high-dimensional interactions. Department of Statistical and Actuarial Sciences. Western University. |
| 2021/04/12 | Advances in mixed effects models for prediction and variable selection in high-dimensional data. Department of Mathematics and Statistics. Memorial University. |
| 2021/02/23 | Variable selection methods in high-dimensional genetic data. Quantitative Life Sciences. McGill University. |
| 2020/11/24 | Avances dans les modèles mixtes pour la prévision et la sélection des variables dans les données de grande dimension. Département de mathématiques, Université de Sherbrooke. |
| 2020/11/12 | Avances dans les modèles mixtes pour la prévision et la sélection des variables dans les données de grande dimension. Département de mathématiques, UQAM. |
| 2019/06/24 | Perspectives on High-Dimensional Data Analysis Workshop, Uppsala University. Variable selection with the strong heredity constraint for non-linear interactions with an exposure in high dimensions . |
| 2018/10/02 | Centre for Clinical Epidemiology, Jewish General Hospital. Pick your favorite buzzword: Data Science, Big Data, Machine Learning, Data Science, Big Data, Machine Learning. |
| 2018/03/01 | McGill University, Department of Epidemiology, Biostatistics and Occupational Health. Betting on Sparsity . |
| 2018/02/08 | Université Laval, Département de mathématiques et de statistique. Miser sur la sparsité . |
| 2017/12/18 | Université de Montréal, Département de mathématiques et de statistique. Miser sur la sparsité . |
| 2017/11/16 | HEC Montréal, Department of Decision Sciences. Betting on Sparsity . |

J.3 CONTRIBUTED CONFERENCE PRESENTATIONS

- 2021/06/02 Golchi S*, Forghani R, Bhatnagar SR. Sparse Bayesian Predictive Modelling of Tumor Response from Radiomic Data. 2021 Symposium on Data Science & Statistics (Virtual).
- 2021/05/14 Savadjiev P*, Bhatnagar SR, Semionov A, Dandurand R. A Computational Technique Based on the Mean Curvature of Isophotes for the Detection and Classification of Interstitial Lung Diseases on Chest CT. American Thoracic Society International Conference (Virtual).
- 2021/05/12 Hanley JA*, Bhatnagar SR. Older and newer approaches to the statistical analysis of COVID-19 mortality data. 41st Conference on Applied Statistics (CASI), Maynooth University, Ireland.
- 2020/09/25 **Yang K***, Asgharian M, Bhatnagar SR. Computational Method for High-Dimensional Nonconvex Sparse Learning. McGill (Bio)Statistics Research Day, Montreal, QC.
- 2019/12/14 Bhatnagar SR*, Yang Y, Lu T, Schurr E, Loredó-Osti JC, Forest M, Oualkacha K, Greenwood CMT. Simultaneous SNP selection and adjustment for population structure in high dimensional prediction models. CMStatistics, London, UK.
- 2019/12/06 Muthukrishnan N*, Nett E, Bhatnagar SR, Shatzkes DR, Phillips C, Romero Sanchez GT, Gupta R, Forghani R. Dental Artifact Reduction using a Three-stage Projection-based Metal Artifact Reduction Algorithm for Spectral Imaging: A Phantom Study. Radiological Society of North America (RSNA), Chicago, IL.
- 2019/12/05 Liu X*, Muthukrishnan N, Forghani B, Yu E, Bhatnagar SB, Reinhold C, Forghani R. Tumor Texture Features of Head and Neck Squamous Cell Carcinoma from Different Primary Sites Differ Significantly and Impact on the Performance of Machine Learning Prediction Models. Radiological Society of North America (RSNA), Chicago, IL.
- 2019/12/05 Al Kindi A*, Shrivastava A, Savadjiev P, Bhatnagar SR, Forghani R, Reinhold C. Renal Cysts: Role of MRI-based 3D Texture Features to Classify Renal Cystic Lesions According to the Bosniak Classification. Radiological Society of North America (RSNA), Chicago, IL.
- 2019/07/10 **Islam J**, Turgeon M, Bhatnagar SR. Flexible approach to time-to-event data analysis using case-base sampling. UseR! 2019, Toulouse, France.
- 2019/05/11 Bonaffini PA*, Savadjiev P, Bhatnagar SR, Salman A, Lazaris A, Metrakos P, Gallix B, Reinhold C. Quantitative MRI image analysis for predicting histopathological growth patterns of liver metastases from colorectal cancer. International Society for Magnetic Resonance in Medicine 27th Annual Meeting, Montreal, QC.
- 2018/09/13 Garfinkle R*, Sigler G, Morin N, Ghitulescu G, Bhatnagar S, Faria J, Gordon PH, Vasilevsky CA, Boutros M. Does Time to Closure of Loop Ileostomy Increase the risk of postoperative Ileus? A Large, Single-Institution Canadian Surgery Forum, St Johns, NL.
- 2018/09/13 Chau JK*, Bhatnagar S, Abou Khalil M, Morin N, Vasilevsky CA, Ghitulescu G, Faria J, Boutros M. Short-Term Outcomes of Peri-Operative Blood Transfusions in colorectal Cancer Surgery: A Propensity-Adjusted Analysis Canadian Surgery Forum, St Johns, NL.

- 2018/09/13 Garfinkle R*, Abou-Khalil M, Bhatnagar S, Wong-Chong N, Azoulay L, Morin N, Vasilevsky CA, Boutros M. A Comparison of Pathologic Outcomes of Open, Laparoscopic, and Robotic Resections for Rectal Cancer Using the ACS-NSQIP Proctectomy-Targeted Database: A Propensity Score Analysis. Canadian Surgery Forum, St Johns, NL
- 2018/08/02 Bhatnagar SR*, Oualkacha K, Yang Y, Greenwood CMT. A General Framework for Variable Selection in Linear Mixed Models with Applications to Genetic Studies with Structured Populations. Joint Statistical Meetings, Vancouver, BC.
- 2018/05/02 Garfinkle R*, Wong-Chong N, Petrucci A, Sylla P, Wexner S, Bhatnagar S, Morin N, Boutros M. The Readability, Quality and Accuracy of Online Health Information for Patients with Low Anterior Resection Syndrome MacLean General Surgery Day, Montreal, QC.
- 2018/05/02 Chau JK*, Bhatnagar S, Abou Khalil M, Morin N, Vasilevsky CA, Ghitulescu G, Faria J, Boutros M. Short-Term Outcomes of Peri-Operative Blood Transfusions in colorectal Cancer Surgery: A Propensity-Adjusted Analysis. Fraser Gurd Surgery Research Day, Montreal, QC.
- 2018/05/02 Wong-Chong N*, Abou Khalil M, Garfinkle R, Bhatnagar S, Ghitulescu G, Vasilevsky CA, Morin M, Boutros M. Are rectal cancer patients with pretreatment N2-positive disease suitable for “Watch and Wait” protocols? An ACS-NSQIP analysis. Fraser Gurd Surgery Research Day, Montreal, QC.
- 2018/05/02 Garfinkle R*, Wong-Chong N, Petrucci A, Sylla P, Wexner S, Bhatnagar S, Morin N, Boutros M. The Readability, Quality and Accuracy of Online Health Information for Patients with Low Anterior Resection Syndrome. Fraser Gurd Surgery Research Day, Montreal, QC.
- 2018/07/21 Wong-Chong N*, Abou Khalil M, Garfinkle R, Bhatnagar S, Ghitulescu G, Vasilevsky CA, Morin M, Boutros M. Are rectal cancer patients with pretreatment N2-positive disease suitable for “Watch and Wait” protocols? An ACS-NSQIP analysis. ACS Quality and Safety Conference, Orlando, FL.
- 2017/09/13 Abou Khalil M*, Bhatnagar SR, Vasilevsky CA, Morin N, Ghitulescu G, Feldman L, Longtin Y, Boutros M: Development and validation of a clinical risk calculator for fulminant *Clostridium difficile* colitis. Resident Research Retreat, Canadian Surgical Forum, Victoria, British Columbia, Canada.
- 2017/07/24 Kronfli N*, Bhatnagar SR, Moodie EEM, Hull M, Klein MB: Trends in Cause-Specific Mortality in HIV-hepatitis C (HCV) co-infected patients in Canada (2003–2016): Possible Beneficial impact of HCV therapy. 9th IAS Conference on HIV Science, Paris, France.
- 2017/06/12 Bhatnagar SR*, Yang Y, Jolicoeur-Martineau A, Wazana A, Greenwood CMT: [Variable Selection in Nonlinear Interactions with the Group Lasso](#). 45th Annual Meeting of the Statistical Society of Canada, Winnipeg, Canada.
- 2016/11/18 Bhatnagar SR: [Genomic Visualisations for Biologists in R](#). Plotcon 2016, New York City, NY. [YouTube video of presentation](#).
- 2016/11/03 Bhatnagar SR*, Yang Y, Khundrakpam B, Evans A, Blanchette M, Bouchard L, Greenwood CMT: [An analytic approach for interpretable predictive models in high dimensional data, in the presence of interactions with exposures](#). 25th Annual International Genetic Epidemiology Society Meeting, Toronto, Canada.

- 2016/09/09 Hamadani FT*, Bhatnagar SR, Balvardi S, Trepanier M, Grushka J, Deckelbaum D, Court O, Fata P: Burnout and Career Satisfaction Among Canadian General Surgeons: Results of the CAGS National Burnout Study. Canadian Surgery Forum, Toronto, Canada.
- 2016/07/10 Bhatnagar SR*, Yang Y, Blanchette M, Greenwood CMT: [Strong Heredity Models in High Dimensional Data](#). 28th International Biometrics Conference, Victoria, Canada.
- 2016/04/18 Bhatnagar SR*, Yang Y, Blanchette M, Greenwood CMT: [A Model for Interpretable High-Dimensional Interactions](#). 5th Annual Canadian Human and Statistical Genetics Meeting, Halifax, Canada.
- 2015/04/19 Bhatnagar SR*, Houde A, Voisin G, Bouchard L, Blanchette M, Greenwood CMT: [DNA methylation and Expression to predict childhood obesity](#). 4th Annual Canadian Human and Statistical Genetics Meeting, Vancouver, Canada.

J.4 POSTER PRESENTATIONS

- 2017/10/22 Abou Khalil M*, Bhatnagar SR, Vasilevsky CA, Morin N, Ghitulescu G, Feldman L, Longtin Y, Boutros M: A Nomogram for Prediction of Mortality in Patients who Undergo Surgery for Fulminant Clostridium Difficile Colitis: Results from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) Database. American College of Surgeons' 2017 Clinical Congress, San Diego, CA, USA.
- 2017/09/10 Bhatnagar SR*, Oualkacha K, Yang Y, Forest M, Greenwood CMT: [Estimation for High-Dimensional Multivariate Linear Mixed Models in Structured Populations](#). 2017 International Genetic Epidemiology Society Meeting, Cambridge, UK.
- 2017/05/13 Nadig A*, Flanagan T, Bhatnagar SR, White K: Results of a RCT on a Transition Support Program for Adults with ASD: Effects on Quality of Life and Self-Determination. 2017 International Meeting for Autism Research, San Francisco, California, USA.
- 2016/05/12 Hull M*, Bhatnagar SR, Moodie EEM, Klein M: Trends in causes of mortality in the Canadian Co-infection cohort (CCC) 2005 – 2015. 25th Annual Canadian Conference on HIV/AIDS Research, Winnipeg, Canada.
- 2016/04/17 Bhatnagar SR*, Yang Y, Blanchette M, Greenwood CMT: [A Model for Interpretable High Dimensional Interactions](#). 5th Annual Canadian Human and Statistical Genetics Meeting, Halifax, Canada.
- 2015/04/19 Bhatnagar SR*, Houde A, Voisin G, Bouchard L, Blanchette M, Greenwood CMT: [Integrating DNA Methylation and Gene Expression data in Placenta Tissue to Predict Childhood Obesity](#). 4th Annual Canadian Human and Statistical Genetics Meeting, Vancouver, Canada. *\$1,000 Award for Best Poster*
- 2014/08/24 Bhatnagar SR*, Greenwood CMT, Labbe A: [Transmission Ratio Distortion in Extended Families](#). Genetic Analysis Workshop 19, Vienna, Austria.
- 2014/08/25 Sun J, Bhatnagar SR*, Oualkacha K, Ciampi A, Greenwood CMT: [Joint analysis of multiple blood pressure phenotypes in GAW19 data by using a multivariate rare-variant association test](#). Genetic Analysis Workshop 19, Vienna, Austria.
- 2014/05/26 Bhatnagar SR*, McGregor K*, Turgeon M*: [Effect of economy on TV time use](#). 42nd Annual Meeting of the Statistical Society of Canada, Toronto, Ontario.

J.5 SEMINAR PRESENTATIONS

2017/07/12	Bhatnagar SR, Forest M, Keller-Baruch J: Statistics vs. Machine Learning: Why cant we be friends? Lady Davis Institute, Montreal Jewish General Hospital.
2016/05/19	Bhatnagar SR: Methods for High Dimensional Interactions Ludmer Centre for Neuroinformatics and Mental Health, Montreal Neurological Institute.
2015/08/12	Bhatnagar SR: Introduction to knitr and R Markdown . Montréal UseR Group, Notman House, Montréal.
2015/03/12	Bhatnagar SR: Imputing the Epigenome . Lady Davis Institute, Montreal Jewish General Hospital.
2015/03/05	Bhatnagar SR: Making sense of Methylation & Expression data in Cordblood and Placenta Tissues . Lady Davis Institute, Montreal Jewish General Hospital.
2014/04/07	Bhatnagar SR: Estimation and Accuracy after Model Selection by Bradley Efron . Department of Mathematics and Statistics, McGill University.
2014/01/23	Bhatnagar SR: Reproducible Research and Biostatistics . Biostatistics Reading Group, McGill University.
2014/08/07	Bhatnagar SR*, Greenwood CMT, Labbe A: Transmission Ratio Distortion in Extended Families . Lady Davis Institute, Montreal Jewish General Hospital.
2013/08/30	Bhatnagar SR: Absolute Risk Estimation in a Case Cohort Study of Prostate Cancer . Department of Mathematics and Statistics, Queen's University.
2013/03/06	Bhatnagar SR: Colorectal Cancer Screening in Visible Minorities in Canada . Department of Public Health Sciences, Queen's University.
2012/11/27	Bhatnagar SR: Computational Methods for the Case-Cohort Design . Department of Public Health Sciences, Queen's University.

K. SOFTWARE

* download counts according to official CRAN logs as of September 20, 2021

1. R package **eclust**: Dimension reduction technique for analyzing interactions between a high dimensional dataset (e.g. genomics, brain imaging), the environment and a response. <https://cran.r-project.org/package=eclust>. 19k downloads.
2. R package **gglasso**: A unified algorithm, blockwise-majorization-descent, for efficiently computing the solution paths of the group-lasso penalized least squares, logistic regression, Huberized SVM and squared SVM. <https://cran.r-project.org/package=gglasso>. 79k downloads
3. R package **casebase**: Fit smooth-in-time parametric hazard functions using case-base sampling. This approach allows the explicit inclusion of the time variable into the model, which enables the user to fit a wide class of parametric hazard functions. <https://cran.r-project.org/package=casebase>. 34k downloads.
4. R package **manhattanly**: Create interactive Q-Q and manhattan plots that are usable from the R console, in the 'RStudio' viewer pane, in 'R Markdown' documents, and in 'Shiny' apps. <https://cran.r-project.org/package=manhattanly>. 36k downloads.

5. R package **acm4r**: Fragment lengths or molecular weights from pairs of lanes are compared, and a number of matching bands are calculated using the Align-and-Count Method <https://cran.r-project.org/package=acm4r>. 33k downloads.
6. R package **sail**: Sparse Additive Interaction Learning with the strong heredity property, i.e., an interaction is selected only if its corresponding main effects are also included. Fits high-dimensional linear models with non-linear interactions via penalized maximum likelihood. <https://cran.r-project.org/package=sail>. 7.8k downloads.
7. R package **ggmix**: Implementation of a linear mixed model with lasso penalty as described in the paper 'Simultaneous SNP selection and adjustment for population structure in high dimensional prediction models'. <https://cran.r-project.org/package=ggmix>. 6.7k downloads.
8. Shiny Application **Prediction of Postoperative Ileus After Loop Ileostomy Closure**: Post-operative ileus (POI) is a significant complication after loop ileostomy closure given both its frequency and impact on the patient. The purpose of this calculator is to assess the risk for POI after loop ileostomy closure. <http://ileusafterileostomy.com/>.
9. Shiny Application **cdiff**: Interactive, online web application to guide preoperative decision making for patients with fulminant Clostridium difficile colitis (FDCD) being evaluated for surgery. This calculator predicts 30-day postoperative mortality for patients with FDCD based on easily attainable pre-operative parameters. <https://sahir.shinyapps.io/cdiff/>.

L. TEACHING

L.1 GRADUATE COURSES

2021 Fall	EPIB607: Principles of Inferential Statistics. 4 Credits, 48 in-class hours, 96 graduate students enrolled. Department of Epidemiology, Biostatistics and Occupational Health, McGill University.
2021 Winter	Fundamentals of Clinical Research for Radiologists. Lecture series, 20 hours online, 20 radiology residents attend.
2020 Fall	EPIB607: Principles of Inferential Statistics. 4 Credits, 48 in-class hours, 80 graduate students enrolled. Department of Epidemiology, Biostatistics and Occupational Health, McGill University.
2020 Winter	Fundamentals of Clinical Research for Radiologists. Lecture series, 20 in-class hours, 30 radiology residents attend.
2019 Fall	EPIB607: Principles of Inferential Statistics. 4 Credits, 48 in-class hours, 73 graduate students enrolled. Department of Epidemiology, Biostatistics and Occupational Health, McGill University.
2019 Winter	Fundamentals of Clinical Research for Radiologists. Lecture series, 20 in-class hours, 40 radiology residents attend.
2018 Fall	EPIB607: Principles of Inferential Statistics. 4 Credits, 48 in-class hours, 81 graduate students enrolled. Department of Epidemiology, Biostatistics and Occupational Health, McGill University.
2017 Fall	MATH697: Mathematical Statistics. 4 Credits, 48 in-class hours, 10 graduate students. Quantitative Life Sciences, McGill University.

L.2 SHORT COURSES AND TUTORIALS

2019/05/27	Creating an R Package (https://sahirbhatnagar.com/rpkg/). Part of the BIOS 702 course. McGill University.
2019/05/14	Atelier d'une journée sur les outils pour la diffusion rapide et reproductible de la recherche (https://github.com/sahirbhatnagar/raqc). R à Québec. Campus de l'Université Laval.
2019/05/09	Data analysis using penalized regression methods . McGill Summer School in Health Data Analytics.
2019/02/27	Data Organization in Spreadsheets and Tidy Data . McGill Environmental Epidemiology Seminar.
2018/07/08	4 day Introduction to R Workshop . Northwestern Polytechnical University. Xi'an, China.
2018/06/02	Having an Online Presence: Tools for Reproducible and Rapid Dissemination of Research . 6th Annual Canadian Statistics Student Conference. Montréal, QC.
2018/02/28	Introduction to Regression Trees . MATH 680 - Computation Intensive Statistics. Department of Mathematics and Statistics, McGill University.
2018/02/08	Modèles darbres de régression . Mini-cours. Département de mathématiques et de statistique, Université Laval.
2017/03/28	Introduction to the R package casebase for fitting smooth-in-time prognostic risk functions for survival data and visualizing incidence density using population time plots. Guest lecturer for BIOS 602 - Epidemiology Regression Models II. Department of Epidemiology, Biostatistics and Occupational Health, McGill University.
2016/05/21	GitHub for Data Scientists without the Terminal: http://sahirbhatnagar.com/git4ds/
2016/04/15	Loops and Simulations in R. Department of Epidemiology, Biostatistics and Occupational Health, McGill University. Sponsored by Epidemiology, Biostatistics and Occupational Health Student Society (EBOSS). http://www.sahirbhatnagar.com/biosR/
2016/03/23	Introduction to the R package casebase for fitting smooth-in-time prognostic risk functions for survival data and visualizing incidence density using population time plots. Guest lecturer for BIOS 602 - Epidemiology Regression Models II. Department of Epidemiology, Biostatistics and Occupational Health, McGill University.
2015/07/29	Atelier sur le logiciel en R: Un introduction à la programmation en R . GERAD: Groupe d'études et de recherche en analyse, Université de Montréal. Sponsored by HEC Montréal.
2015/05/28	Reproducible Research: An introduction to knitr . Department of Epidemiology, Biostatistics and Occupational Health, McGill University. Sponsored by the CRM Statistics Laboratory and the Montreal Biostatistics Seminar Series.
2013/05/13	Introduction to L^AT_EX . Queen's University, Department of Mathematics and Statistics.

L.3 RESEARCH TRAINEES SUPERVISED

Graduate students: Doctoral degree supervision

2019 –	Kai Yang, Ph.D Biostatistics. (Co-supervisor: Masoud Asgharian) CRM StatLab Graduate Award (\$500)
2019 –	Julien St-Pierre, Ph.D Biostatistics. (Co-supervisor: Karim Oualkacha) CRM StatLab Graduate Award (\$500)
2019 –	Jesse Islam, Ph.D QLS. (Co-supervisor: Rob Sladek) District 3 - AI Genomics Competition Award 1st place (\$2,000) District 3 - AI Genomics Demo Day IVADO Prize Statistical Society of Canada Annual Meeting Travel Award (\$500) QLSDay 2021 Presentation Award - 3rd Place
2020 –	Zeyu Bian, Ph.D Biostatistics. (Co-supervisor: Erica EM Moodie)
2018 – 2020	Richard Garfinkle, Ph.D Experimental Surgery. (Co-supervisor: Marylise Boutros)

Graduate students: Doctoral degree thesis committee member

2019 –	Le Chang, Ph.D Human Genetics, McGill University.
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Graduate students: Doctoral degree thesis examiner

2019	Omidali Aghababaei Jazi, Ph.D Mathematics and Statistics, McGill University.
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Graduate students: Doctoral degree comprehensive examiner

2019	Yixiao Zeng, Ph.D QLS, McGill University.
2019	Maria Abou Khalil, Ph.D Experimental Surgery, McGill University.
2020	Robert Goulden, Ph.D Epidemiology, McGill University.
2020	Yi Lian, Ph.D Biostatistics, McGill University.

Graduate students: Master's degree supervision

2019 – 2020	Haoyu Wu, M.Sc. Epidemiology. (Co-supervisor: Brent Richards). Graduate Research Enhancement and Travel Awards (\$560) <i>Current position:</i> Ph.D. student McGill Biostatistics
2019 – 2020	Charl��lie Davidts, L'Universit�� du Qu��bec �� Montr��al. (Co-supervisor: Karim Oualkacha). <i>Topic: Fast Low-rank approximations in high-dimensional mixed-effects models.</i>

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| 2020 – | Jingyan Fu, M.Sc. Biostatistics. (Co-supervisor: Jay Brophy). <i>Topic: Bayesian regularisation methods.</i> |
| 2021 – | Cindy Leung Soo, M.Sc. Epidemiology, McGill University. (Co-supervisor: Nikita Pai). |

Graduate students: Master's degree thesis committee member

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| 2019 – 2020 | Lan Bowen, M.Sc. Epidemiology, McGill University. (Co-supervisor: Scott Weichenthal). |
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Undergraduate trainee supervision

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| 2021 – | Arthur Ayestas Hilgert, B.Sc. Mathematics and Statistics, McGill University. |
| 2021 – | Yu Rong, B.Sc. Mathematics and Statistics, McGill University. |
| 2021 – | Zijian Pei, B.Sc. Mathematics and Statistics and Computer Science, McGill University. |
| 2021 – | Jiajun Yu, B.Sc. Mathematics and Statistics, McGill University. |
| 2021 – 2021 | Zhiwei (Alouette) Zhang, B.Sc. Quantitative Biology, McGill University. McGill Initiative in Computational Medicine Summer Scholars Award (\$7,125) - <i>declined</i> |
| 2020 – 2021 | Peter Her, B.Sc. Pharmacology, McGill University. |
| 2020 – 2021 | Mohan Zhao, B.Sc. Mathematics and Statistics, McGill University. |

Practicum students

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| 2019 | Tianyuan Lu, Ph.D Quantitative Life Science, McGill University. 3 month rotation. <i>Topic: Polygenic risk scores based on penalized multivariable mixed-effects models</i> |
| 2019 | Jesse Islam, Ph.D Quantitative Life Science, McGill University. 3 month rotation. <i>Topic: Smooth-in-time parametric hazard functions using case-base sampling.</i> |

M. OTHER CONTRIBUTIONS

M.1 REVIEWER OF JOURNAL ARTICLES

International Journal of Epidemiology, BMC Bioinformatics, Journal of the American Statistical Association: Theory and Methods, International Journal of Biostatistics, PloS Genetics, PloS One

M.2 GRANT PANELS

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| 2021 | Medical Research Council (MRC) Research Grant |
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M.3 EVENT/SESSION ORGANIZATION

2019	Co-organizer for the invited session on Variable Selection in High-dimensional Models. International Workshop on Perspectives on High-dimensional Data Analysis, Uppsala University, Sweden.
2018	Chair for the invited session on Advances in Estimation Methods. Joint Statistical Meetings, Vancouver, BC.

M.4 ADMINISTRATIVE RESPONSIBILITIES AND COMMITTEES

2021	Abstract reviewer, Canadian Statistics Student Conference
2020	Abstract reviewer, EBOH Research Day
2020	Abstract reviewer, Canadian Statistics Student Conference
2018 –	Chair, Data Science / Health Analytics Certificate Committee
2019 –	Member, Biostatistics Admissions Committee
2015–2018	International Genetic Epidemiology Society Communications Committee Member
2014–2015	Post-Graduate Students' Society (PGSS) Councillor

M.5 PROFESSIONAL ASSOCIATIONS

2011–	Society of Actuaries
2013–	Statistical Society of Canada
2016–	International Genetic Epidemiology Society