

June 2020

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Education: · Faculty, York University, Toronto, 1995-present
 · Postdoctoral-Fellow, International Comp. Sci. Inst., Berkeley CA, 1993-1995.
 · Ph.D., Computer Science, Univ. of Toronto, 1993.
 “Time-Space Lower Bounds for Undirected and Directed *st*-Connectivity
 on JAG Models.” Thesis adviser: *Dr. Faith Ellen*.
 · M.S., Computer Science, Univ. of Toronto, 1990.
 “Element Distinctness on COMMON.” Thesis adviser: *Dr. Faith Ellen*.
 · B.Math, Co-op Bachelor of Mathematics, Univ. of Waterloo, 1987.

Research · scheduling multi-processor jobs
Interests: · secure data transmission over networks for multi-media applications
 · complexity theory
 · probability theory
 · parallel lower bounds and algorithms
 · graph theory, combinatorics, and optimization

Limited Machine Learning Experience:

- *Preparing to teach Machine Learning on Zoom in Cameroon Jan-March 2021*
- *Learning Theory Seminar At Vector* I have attended this a few times with Ruth Urner. I would like to be able to attend it more with my new graduate student.
- *Artificial Intelligence Hive Lassonde, York University.* I have given two talks.
<https://www.youtube.com/watch?v=vCyQgsjrc9s&feature=youtube>
- I have slipped more machine learning into my classes courses.
http://www.eecs.yorku.ca/~jeff/courses/fun/Machine_Learning_Made_Easy.pptx
- *Deep Learning and Reinforcement Learning Summer School* CIFAR Vector Institute, Toronto, July 25th August 3rd, 2018
- *Neural Networks for Machine Learning*, by Geoffrey Hinton, on line course in coursera, 2018
- *Understanding Machine Learning from Theory to Algorithms* by Shalev-Shwartz and Ben-David. Cambridge press
- *Neural Networks and Deep Learning* by Michael Nielsen 2017,
<http://neuralnetworksanddeeplearning.com>.
- *Understanding LSTM Networks* by Christopher Olah <http://colah.github.io/posts/2015-08-Understanding-LSTMs/>
- Taking Toni Pitassi’s *Ethics of Machine Learning* course at U of T.

Scholarly and Professional Activities (Invited Talks and/or I invited myself):

- *Artificial Intelligence Hive Lasseonde, York University.* I have given two talks. <https://www.youtube.com/watch?v=vCyQgsjrc9s&feature=youtube>
- African Institute of Mathematical Sciences (AIMS): Taught 2-7 hours a day masters level courses in Ghana, Senegal, Tanzania, and Cameroon, 2015-2016.
- Workshop on Proof Complexity: Banff International Research Station 2011
- Workshop on Scheduling: Dagstule 2010.
- Workshop on Cake Cutting: Dagstule 2008.
- Workshop on Scheduling: France 2007.
- Univ. of Toronto: Every year or two at the theory colloquium
- York Univ.: Every five years or so at the theory colloquium (too hard to get people to come).
- Univ. of California at San Diego or Princeton Inst. for Advanced Studies: Every two years or so visiting R. Impagliazzo
- Planning for my first Sabbatical 2001: CWI Amsterdam, Chennai, Bangalore, TIFR Bombay, IIT Bombay.
- Early years at York (\approx 1996) Univ. of Waterloo, Hong Kong, McMaster.
- Late Graduate School or Postdoc (1994): Carnegie Mellon, Univ. of Pittsburgh, Univ. of Washington, Simon Fraser Univ., Univ. of California at Santa Cruz, Emory in Atlanta, Georgia State University.

Masters Supervision:

- **Karan Singh, Masters (Co-supervisor Urner), Started 2019.**
- **Yunge Hao, Masters (Co-supervisor Tournalakis), Started 2019.**
- Stephen Voland, Masters, “Random Polyhedral Scenes”, 2015. Currently: Software Engineer at bid13.com - Online Storage Auctions
- Kowsar Hossain, Masters (Supervisor Datta), “An Efficient MAC protocol for Wireless Sensor and Ad Hoc Networks,” 2017. Present Position: Lecturer, Khulna University of Engineering and Technology
- Nassim Nasser, Masters 2008.
- James Hyukjoon Kwon, Masters 2008.
- Jaisingh Solanki, Masters 2007.
- Donald Chinn, postdoctoral fellowship 1995.

Graduate Co-Supervision:

- Venkatesh Medabalimi, Doctorate (Supervisor Cook) 2018
(We published two branching program lower bound papers together.)
- Oscar Gonzalez, Post Doc (Supervisor Tsotsos) 2017 “Short and Long-Term Attentional Firing Rates Can Be Explained by ST-Neuron Dynamics Frontiers in Neuroscience.” Currently: York
- Toni Kunic, Masters (Supervisor Tsotsos) 2017 “Program Compiler: Understanding natural languages to execute tasks.” Currently: Computer Vision Researcher, York U.
- Feng Gao, Masters (joint with Tournalakis), “A Short and Readable Proof of Cut Elimination for Two First-Order Modal Logics”, 2016
- Tasos Sidiropoulos, Post Doc 2008-2009.
- I took an advisory role with the University of Toronto graduate students I. Mertz, V. Medabalimi, D. Achlioptas, C.K. Poon, and G. Barnes. I wrote papers with each of these people.

Masters Supervision in Africa:

- Chilperic Armel Foko Kuate, Masters, AIMS-Ghana, 2016 “Reverse engineering of T-cell Proliferation dynamics.” Has done a second masters and has been teaching. We are working on getting him a visa to study at York University
- Guy Fabrice Gounoue, AIMS-Cameroon, 2016 “Differential equations governing rabies populations in Sub-Saharan Africa.” We have been in regular contact. Met once in England. Currently: PhD in Germany and South Korea
- Salvatory Roman Kessy, Masters AIMS-Tanzania, 2016 “Actuarial models for Farmers in Tanzania.” Currently: PhD at Southampton Uni in UK on full Chevening scholarship and will return to Tanzania to fill a deep need for Actuaries
- Leclair Anjipu, Masters, AIMS-Senegal, 2016 “Big Data Algorithms.” Currently: Big Data, Smile Open Source Solutions
- Evans Okyere, Masters, AIMS-Tanzania, 2016 “Applications of line graphs.”

Under Graduate Supervision:

- Pedram Ahadinejad 4070 project 2020
- Mahmoudreza Eskandarijam 4070 project 2020
- Goharanpour Bardia, 4070 project 2018
- Alexandra Zaslavsky, 4070 project 2018
- CJ D’Alimonte, 4080 project 2017
- Jake Peters, 4080 project 2015
- Chang-Han Chiang, 4080 project 2013
- Rubin Sung Hoon Yoo, 4080 project 2012
- Oren Shemesh, 4080 project 2012
- Doug Scheurich, 4080 project 2012
- Kian Shokouhi, Undergrad Thesis 2008.
- Daniel Natapov, Undergrad Thesis 2007.
- Geri Grolinger, Undergrad Thesis 2006.

Teaching Experience:

- Math 1090 – Formal Proof Systems - Worked crazy hard to learn and teach in a brand new way.
- COSC 1030 – Intro to Computer Science II - Course Director (6 times 95-98)
- CSE 2001 – Intro to the Theory of Computation (4 times)
- CSE 2011 – Intro to Data Structures (1 time)
- CSE 3510 – Data Structures (F95)
- CSE 3101 – Intro to Algorithms (22 times 99-)
- CSE 4022 – Advanced Theory (W99)
- CSE 4111 – Computability & Complexity (2 times W11-)
- COSC 5115,6115 – Grad Course in Complexity Theory (W96,F98)
- COSC 6121,6111 – Grad Algorithms (8 times W04-)

Service:

- ACM Programming J. Edmonds (chair)
- Awards and Scholarships
- Petitions Committee (chair)
- Department and Curriculum committee (LCS) EECS Science programs representative.
- Planning, Academic Resources and Research (PARR)
- Hiring (two years)
- T & P (a few years)
- undergrad advising (many years)
- high school visits (five times)
- executive committee (one year)
- graduate admissions (many years)
- Curriculum (three years)
- Internship Coordinator (two years)

Reviewing Conferences and Journals:

- I have never been on a committee but I help review about six papers a year.

Awards:

- York's Merit Award [2000,2001,2002,2009]

External Research Funding:

- New Frontiers in Research Fund Exploration 2019 Application ID: NFRFE-2019-00549 Title: Molecular Data Stores: DNA as a Medium for Information Storage with Sebastian Magierowski
- NSERC ('19-'24) [\$23,000/yr × 5]
- On going member at Centre for Innovation in Computing @ Lassonde
- NSERC ('11-'16) [\$15,000/yr × 5]
- NSERC ('05-'10) [\$32,000/yr × 5]
- NSERC ('00-'04) [\$32,000/yr × 5]
- CITO (13 people), Fundamental Issues in Computing, (1998-2000), [\$90,000/yr × 2]
- A NCE grant called MITACS (co-applicant with 200 others).
- NSERC ('95-'99) [\$25,000]
- NSF Postdoctoral Scholarship, (1993–1995) [\$33,000 US/yr × 2]
- NSERC Postdoctoral Scholarship, (1993–1995) [\$30,000/yr × 2]
- Ontario Graduate Scholarship (OGS), (1991–1993)
- NSERC Graduate Scholarship, (1989–1991)

Papers in Refereed Journals (and Refereed Conferences):

- In progress: J. Edmonds, K. Singh, and R. Uerner, “Fairness in Machine Learning”.
- S. Davis, J. Edmonds, and R. Impagliazzo, “Power of Free Branching in a General Model of Backtracking and Dynamic Programming Algorithms,” Submitted to *Algorithmica*.
- J. Edmonds and Alex Edmonds, “Search Time when Solving Random Jigsaw Puzzles with a Planted Solution,” Submitted to *Algorithmica*.
- J. Edmonds and M. Luby, “Erasure Codes with a Hierarchical Bundle Structure” Submitted to *IEEE Transactions on Information Theory*.
- M. Solbach, S. Volland, J. Edmonds, and J. Tsotsos, “Random Polyhedral Scenes: An Image Generator for Active Vision System Experiments,” *arXiv:1803.10100*, 2018
- K. Hossain, S. Datta, I. Hossain, and J. Edmonds, “ResVMAC: A Novel Medium Access Control Protocol for Vehicular Ad hoc Networks,” *Procedia Computer Science*, 109, p. 432-439, 2017.
- S. Dobрева, J. Edmonds, D. Komm, R. Kralovic, R. Kralovic, S. Krug, and T. Momke, “Improved Analysis of the Online Set Cover Problem with Advice” *Journal of Theoretic Computer Science* 2017.
- A. Chattopadhyay, J. Edmonds, F. Ellen, and T. Pitassi, “A Little Advice Can Be Very Helpful,” or “Upper and Lower Bounds on the Power of Advice,”
 - *SODA, ACM Symp. on Discrete Algorithms*, 2012.
 - *SIAM Journal on Computing (SICOMP)*, 2016
- J. Edmonds and K. Pruhs, “Scalably Scheduling Processes with Arbitrary Speedup Curves,”
 - *ACM Transactions on Algorithms* 8(3): 28 (2012)
 - *SODA, ACM Symp. on Discrete Algorithms*, 2009, p. 685-692.
- J. Edmonds, “On the Competitiveness of AIMD-TCP within a General Network,”
 - *Journal Theoretical Computer Science*, 2012
 - *Lecture Notes in Computer Science*, Volume 2976/2004.
 - *LATIN, Latin American Theoretical Informatics*, pp. 577-588, 2004.
- J. Edmonds and K. Pruhs, “Cake Cutting Really is Not a Piece of Cake,”
 - *ACM Transactions on Algorithms* 7(4): 51 (2011)
 - *SODA, ACM Symp. on Discrete Algorithms*, pp. 271-278 2006.
- H. Chan, J. Edmonds, T. Lam, L. Lee, A. Marchetti-Spaccamela, and K. Pruhs, “Nonclairvoyant Speed Scaling for Flow and Energy,”
 - *Algorithmica* 61(3): 507-517 (2011)
 - *STACS, The 26th International Symposium on Theoretical Aspects of Computer Science*, pp. 255-264, 2009.
 - CoRR abs/0902.1260: (2009)
- H. L. Chan, J. Edmonds, and K. Pruhs, “Speed Scaling of Processes with Arbitrary Speedup Curves on a Multiprocessor,”
 - *Theory of Computing Systems*, 2011
 - *SPAA, ACM Symp. of Parallelism in Algorithms and Architectures*, 2009, p. 1-10.
- J. Edmonds, S. Datta, and P. Dymond, “TCP is Competitive with Resource Augmentation (Against a Limited Adversary),”
 - *Theory of Computing Systems*, Vol 47 pp. 137-161, 2010.
 - *SPAA, ACM Symp. of Parallelism in Algorithms and Architectures*, pp. 174-183, 2003.

Papers in Refereed Journals (and Refereed Conferences) Cont.:

- J. Edmonds, “Every Deterministic Nonclairvoyant Scheduler has a Suboptimal Load Threshold,”
 - *Journal of Scheduling*, 2010.
 - Dagstuhl Seminar Proceedings, 2010.
- J. Edmonds, “Embedding into l_∞^2 is Easy Embedding into l_∞^3 is NP-Complete”,
 - *The Journal of Discrete and Computational Geometry*, pp.747-765 2008.
 - *SODA, ACM Symp. on Discrete Algorithms*, 2007
- J. Edmonds and K. Pruhs, “A Maiden Analysis of Longest Wait First,”
 - *ACM Transactions on Algorithms*, Volume 1 Issue 1, pp. 14-32, 2005
 - *SODA, ACM-SIAM Symposium on Discrete Algorithms*, 2004
- J. Edmonds and K. Pruhs, “Multicast Pull (Broadcast) Scheduling: When Fairness Is Fine,”
 - *Special Issue Algorithmica on Online Algorithms*, Volume 36, pg. 315-330, 2003.
 - *SODA, ACM-SIAM Symposium on Discrete Algorithms*, 2002, p. 421-430.
- J. Edmonds, J. Gryz, D. Liang, R. Miller, “Mining for Empty Rectangles in Large Data Sets”,
 - *Journal Theoretical Computer Science*, Vol 296, No 3, pp. 435-452, 2003.
 - Patented.
 - *International Conference on Database Theory*, 2001, pg 174-188.
 - Technical Report CSRG-410 Dept. of Comp. Sci., University of Toronto.
- J. Edmonds, D. Chinn, T. Brecht, X. Deng, “Non-clairvoyant Multiprocessor Scheduling of Jobs with Changing Execution Characteristics”,
 - *Special Issue of Journal of Scheduling on "Online Problems"*, #6:3, pp 231-250, 2003.
 - *STOC, ACM Symp. on Theory of Computing*, pp. 120-129, 1997.
- J. Edmonds, R. Impagliazzo, S. Rudich, and J. Sgall, “Communication Complexity Towards Lower Bounds on Circuit Depth,”
 - *Journal of Computational Complexity*, 10: pp 210-246, 2001.
 - *FOCS, Symp. Foundations of Computer Science*, pp. 249-257, 1991.
- J. Edmonds “Scheduling in the Dark”,
 - Improved results: manuscript 2001.
 - *Blum's Special Issue of the Journal of Theoretic Computer Science*, 235:109-141, 2000.
 - *STOC, ACM Symp. on Theory of Computing*, pp. 179-188, 1999.
- P. Beame, S. Cook, J. Edmonds, R. Impagliazzo, and T. Pitassi, “The relative complexity of NP search problems,”
 - *Journal of Computer and System Sciences*, 57:3-19, 1998. Special issue of invited papers from 1995 STOC.
 - *STOC, ACM Symp. on Theory of Computing*, pp. 315-324, 1995.
- G. Barnes, J. Edmonds, “Time-Space Lower Bounds for Directed ST-Connectivity on Graph Automata Models (JAG),”
 - *SIAM Journal on Computing*; Volume 27, Number 4, pp. 1190-1202, 1998.
 - *FOCS, Symp. on Foundations of Comp. Sci.*, pp. 228-237, 1993.

Papers in Refereed Journals (and Refereed Conferences) Cont.:

- J. Edmonds, “Time–Space Tradeoffs for Undirected ST-Connectivity on a Graph Automata (JAG),”
 - *SIAM Journal on Computing*; Volume 27, Number 5, pp. 1492-1513, 1998.
 - *STOC, ACM Symp. on Theory of Computing*, pp. 718-727, 1993.
- J. Edmonds, and C.K. Poon, D. Achlioptas, “Tight lower bounds for *st*-connectivity on NN-JAGs”,
 - *SIAM Journal on Computing*, 1997.
- J. Edmonds, “Fundamental study removing Ramsey theory: lower bounds with smaller domain size,”
 - *Journal of Theoretical Computer Science*, 172, pp. 1-41, 1997.
 - *Structures in Complexity Theory*, pp. 322-332, 1991.
- A. Albanese, J. Blömer, J. Edmonds, M. Luby, and M. Sudan, “Prioritized Encoding Transmission,”
 - *IEEE Transactions on Information Theory*, Vol. 42, No. 6, 1996.
 - *FOCS, Symp. on Foundations of Comp. Sci.*, pp. 604–612, 1994.
 - *ICSI Technical Report TR94-058*.

Papers in Refereed Conference Proceedings (Submitted to Journals):

- J. Edmonds, V. Medabalimi, and T. Pitassi, “Hardness of Function Composition for Semantic Read once Branching Programs,” *Computational Complexity Conference*, 2018.
- S. Cook, J. Edmonds, V. Medabalimi, and T. Pitassi, “Lower Bounds for Nondeterministic Semantic Read-Once Branching,” *International Colloquium on Automata, Languages and Programming (ICALP)*, 2016.
- S. Datta, J. Edmonds, and K. Hossain, “An Efficient MAC protocol for Wireless Sensor and Ad Hoc Networks” *ANT, Int. Conf. on Ambient Systems, Networks and Technologies*, 2015.
- J. Edmonds, S. Im and B. Moseley, “Online Scalable Scheduling for the ℓ_k -norms of Flow Time Without Conservation of Work,” *SODA, ACM Symp. on Discrete Algorithms*, 2011.
- S. Chakraborty and J. Edmonds, “Bounding Variance and Expectation of Longest Path Lengths in DAGs from Variance and Expectation of Edge Lengths,” *SODA, ACM Symp. on Discrete Algorithms*, 2010.
- J. Edmonds, A. Sidiropoulos, and A. Zouzias, “Hardness of Embedding into \mathcal{R}^2 with Constant Distortion,” *SODA, ACM Symp. on Discrete Algorithms*, 2010.
- J. Edmonds, K. Pruhs, and J. Solanki, “Confidently Cutting a Cake into Approximately Fair Pieces,”
 - *AAIM, Conference on Algorithmic Aspects in Information and Management*, 2008, p. 155-164.
 - Masters thesis under my supervision, 68 pages, 2007.

Papers in Refereed Conference Proceedings (Submitted to Journals) Cont.:

- J. Edmonds and K. Pruhs, “Balanced Allocations of Cake,” *FOCS, Symp. Foundations of Computer Science*, pp. 623-634, 2006.
- S. Davis, J. Edmonds, and R. Impagliazzo, “Online Algorithms To Minimize Resource Reallocations and Network Communication,”
 - *Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques*, Springer pp. 104-115, 2006.
 - *Approx: 9th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems*, pp. 204-219, 2006.
- M. Adler, J. Edmonds, and J. Matoušek, “Towards Asymptotic Optimality in Probabilistic Packet Marking,” *STOC, ACM Symp. on Theory of Computing*, pp. 450-459, 2005.
- M. Clegg, J. Edmonds, R. Impagliazzo, “Using the Groebner basis algorithm to find proofs of unsatisfiability,” *STOC, ACM Symp. on Theory of Computing*, pp. 174-184, 1996.
- N. Alon, J. Edmonds, M. Luby, “Linear Time Erasure Codes with Nearly Optimal Recovery,”
 - Submitted to *IEEE Transactions on Information Theory*.
 - *FOCS, Symp. on Foundations of Comp. Sci.*, pp. 512-519, 1995.
- J. Edmonds, C. K. Poon, “A Nearly Optimal Time-Space Lower Bound for Graph Connectivity Problem on NNJAG Model,” *STOC, ACM Symp. on Theory of Computing*, pp. 147-156, 1995.

Books:

- J. Edmonds, “How to Think About Algorithms”,
 - Text for CSE 3101.
 - Cambridge University Press, 2008.
 - <http://www.amazon.com/Think-About-Algorithms-Jeff-Edmonds/dp/0521614104>
 - Glowing reviews in *SIGACT News* 2008, *Review in Times Higher Education* 2008, and *York Writes* 2009.
 - Translated into Greek 2016
 - Translated into Portuguese 2011
- Thousands of power point slides for algorithms class. They are getting very good reviews in the class and in the community.
- Chapter “Scheduling with Equipartition” in “Encyclopedia of Algorithms,” Springer, Editor Ming-Yang Kao, 2008.

Technical Reports and Abstracts:

- J. Edmonds and K. Pruhs, “Cake Cutting Upper Bound,” Wikipeda page, http://en.wikipedia.org/wiki/Edmonds-Pruhs_protocol, 2014
- J. Edmonds and K. Pruhs, “Cake Cutting Lower Bound,” Taught at CMU 2014: <http://www.cs.cmu.edu/~arielpro/15896/schedule.html>, <http://www.cs.cmu.edu/~arielpro/15896/docs/slides17.pdf> pg 14.
- N. Nasser and J. Edmonds, “PBT Framework and BT Reductions,” Masters project, 54 pages, 2008.
- A. Borodin, J. Edmonds, and H. Kwon, “Improved Results on Models of Greedy and Primal-Dual Algorithms,” Masters thesis under my supervision, 63 pages, 2008.
- J. Edmonds and A. Mirzaian, “Adding Made Easy,” Manuscript
- J. Edmonds, S. Datta, P. Dymond, and K. Ali, “RQM: A new rate-based active queue management algorithm.” York University Technical Report CSE-2006-09.

Patents:

- J. Gryz, R. Miller, J. Edmonds, D. Liang, “Efficient Determination of Homogeneous Rectangles in a Binary Matrix”, 2000. Patented.
- Andres Albanese, Michael Luby, Johannes Blömer and Jeff Edmonds, “Message Encoding and Transmission System and Method for Multilevel Data Redundancy”, *U.S. Patent Application*, Serial Number 08/361,802; 12-21-94, Assignment recorded February 27, 1995, Reel 7364, Frames 685-689.