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Inmar Givoni

My expertise lies in successful application of machine learning techniques to real-world problems that require efficient and practical solutions. To date, I have applied my skills towards various application domains such as self-driving vehicles, robotics, eReading, hardware, computational biology, computer vision for video gaming, and e-commerce. In recent years I have focused on strategic leadership around machine learning & big data related product innovation.

I enjoy working in interactive, collaborative workplace, where hard problems that require going beyond engineering solutions are tackled, where there exists a healthy balance between research and development, and where I can drive and lead efforts towards groundbreaking innovative products. In 2018 I was recognized as one of Canada's 50 inspiring women in STEM.

Higher Education

Ph.D. Computer Science – University of Toronto, Canada 2005-2011
Advisor: Professor Brendan J. Frey
Thesis committee: Geoff Hinton, Richard Zemel, Quaid Morris, Yair Weiss
Machine learning, probabilistic inference in graphical models.

Visiting Academic – University of Cambridge, UK Winter 2009
Host: Professor Zoubin Ghahramani – Computational Learning lab

B.Sc. Computer Science & Computational Biology - 2001-2004
The Hebrew University in Jerusalem, Israel
magna cum laude (average 93.6%), Dean's Honor List, 2002-2004

Professional Experience

Senior Autonomy Engineering Manager - Uber ATG 09.2018 - Present

Autonomy Engineering Manager II - Uber ATG 10.2017 - 08.2018
Leading a team of Research and Software Engineers. Bringing cutting-edge deep-learning based solutions to various self-driving domain problems from internal research team into production. I've built and am leading a team of soon to be 10 software and research engineers and oversee data engineering, storage and compute infrastructure, run-time optimization of deep learning models, and integration and productization of deep learning models into a complex software stack. I am involved in pushing forward a variety of projects across a multi-office organization, coordinating tasks and projects, and providing leadership within the Toronto office.

Director of Machine Learning & Software - Kindred 09.2016 - 10.2017
Developing a new disruptive product in the intelligent robotics space. I led two teams of 15 ML researchers, ML engineers, and SW engineers through the development and deployment of robots for warehouse automation in one of the first industrial applications of robotic grasp learning. My role consisted of recruiting and building the teams, providing mentorship to my technical leads, disseminating information across the organization, ensuring alignment across divisions, product+project management, product owner within scrum for my teams, strategic and roadmap planning, and other tasks associated with senior leadership at a small startup of 50.

VP of Big Data - Kobo 09.2014 - 09.2016
Leading Kobo's Big Data group (14 people), providing technical and research leadership,

setting team strategies, inventing, launching, and driving new data and machine learning based products, product and project management, communication and prioritization across the organization. Conceived, drove, and led improvements in search optimization,recommendations, personalization & targeting and adopting a cross organizational data-driven culture.

Director of Research & Data Science - Kobo 06.2014 - 08.2014
Lead Scientist for a team of seven, overseeing search optimization, recommendation, content analysis, website optimization, A/B testing, predictive analytics (multiple patents filed)

Senior Research Scientist, Big Data team – Kobo 01.2013 – 05.2014
R&D of machine learning and NLP algorithms for content based analysis of e-books including key-term extraction, "wikification", genre classification and more (multiple patents filed)
R&D of technique for automatic generation and Bayesian optimization of web-page layouts for Kobo's website (4 patents filed)

Design Engineer, Member of Technical Staff – Altera 10.2011 – 12.2012
R&D of optimization algorithms for FPGA packing, floor-planning, and placement problems.
Researched, redesigned and enhanced logic utilization estimation and reporting to address complex usability aspects related to measuring digital logic utilization characteristics for FPGA

Research Intern – Machine Learning and Perception Group Microsoft Research Cambridge 06.2010 – 08.2010
Hosts: Prof. Andrew Blake, Dr. Pushmeet Kohli, Dr. James Shotton
R&D of a computer vision algorithm for the pose estimation algorithm of the *Kinect* system.
Patented (*Image Labeling with Global Parameters, US20120219209*)

Research Intern – Search Labs, Microsoft Research Mountain View 04.2009 – 08.2009
Hosts: Dr. Anitha Kannan, Dr. Rakesh Agrawal
R&D of an e-commerce matching algorithm for *Bing*, algorithm deployed in Microsoft platforms,Patented (*Evaluating similarity between semantic inference of offers to products, US20110289026)*, Paper published in ACM KDD 2011

Bioinformatics Researcher 2004 – 2006
Depts. of Medical Genetic and Engineering, University of Toronto
Advisors: Prof. Charles Boone, Prof. Brendan J. Frey, Dr. Quaid D. Morris
R&D of algorithms for detecting yeast genes similarly affected by bio-active compounds.

Senior Developer – Israel Defense Force, Technical Intelligence Unit (8200) 1999 – 2002
Recipient of outstanding excellence award

Technical Skills

C/C++, C#, Python, Java, Matlab, SQL, AWS (EC2, EMR), Hadoop, Perl, HTML, CSS, PHP, XML, LaTex

Soft-skills Certifications

Project management and group facilitation - foundations of project management, understanding group dynamics, group facilitation and coordination, group communication and conflict resolution

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Communication skills – crucial conversations, presentation skills, the art of powerful conversations, proactive and practical communications, effective interviewing, technical writing

Academic Awards & Scholarships

Best Student Paper Award – Runner-up, UAI 2011	07.2011
Google Canada Anita Borg Scholarship Finalist	03.2010
Anita Borg 'SYSters' Pass-It-On Award	10.2009
NSERC Post-Graduate Scholarship (42K)	05.2009
Ontario Graduate Scholarship – declined (10K)	05.2009
Kelly Gotlieb Graduate Fellowship	09.2006
Oscar Getz Undergraduate Summer Research Scholarship	Summer 2003

Referred Publications

14. Min-Max Propagation
Christopher Srinivasa, I.E. Givoni, Siamak Ravanbakhsh, Brendan J Frey
Advances in Neural Information Processing Systems (NIPS), 5569-5577, 2017
13. Determining Shoal Membership using Affinity Propagation
V. Quera, F.S. Beltran, I.E. Givoni, and R. Dolado
Behavioural Brain Research, Vol. 214, pp. 38-49, March 2013
12. Book chapter: Bayesian Painting by Numbers: Flexible Priors for Colour-Invariant Object Recognition
J.C. Chua, I.E. Givoni, R.P. Adams, B.J. Frey,
Machine Learning for Computer Vision, Edited by R. Cipolla, S. Battiato and G. M. Farinella
Studies in Computational Intelligence series, Springer, 2013.
11. Learning Structural Element Patch Models with Hierarchical Palettes
J.C. Chua, I.E. Givoni, R.P. Adams, B.J. Frey
Proc. of the 25th IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June 2012, Providence, RI.
10. Matching Unstructured Product Offers to Structured Product Specifications
A. Kannan, I.E. Givoni, R. Agrawal and A. Fuxman
Proc. 17th Int'l Conf. on Knowledge Discovery and Data Mining (KDD), August 2011, San Diego, CA.
9. Hierarchical Affinity Propagation
I.E. Givoni, C. Chung and B.J. Frey
Proc. 27th Conf. on Uncertainty in Artificial Intelligence (UAI), July 2011, Barcelona, Spain.
8. Graph Cuts is a Max-Product Algorithm
D. Tarlow, I.E. Givoni, R.S. Zemel and B.J. Frey
Proc. 27th Conf. on Uncertainty in Artificial Intelligence (UAI), July 2011, Barcelona, Spain.
Best Student Paper Award – Runner Up
7. Learning Better Image Representations Using 'Flobject Analysis'
P. Li*, I.E. Givoni*, and B.J. Frey
[*: joint first authors], Proc. 24th IEEE conference on Computer Vision and Pattern Recognition (CVPR), June 2011, Colorado Springs, CO.
6. HOP-MAP: Efficient Message Passing with High Order Potentials
D. Tarlow, I.E. Givoni, and R. Zemel
Proc. 13th Int'l Conf. on Artificial Intelligence & Statistics (AISTATS), May 2010, Sardinia.
5. FLoSS: Facility Location for Subspace Segmentation
N. Lazic, I.E. Givoni, P. Aarabi and B.J. Frey
Proc. 12th Int'l Conf. on Computer Vision (ICCV), October 2009, Kyoto, Japan.
4. Semi-Supervised Affinity Propagation with Instance-Level Constraints
I.E. Givoni and B.J. Frey
Proc. 12th Int'l Conf. on Artificial Intelligence & Statistics (AISTATS), April 2009, Clearwater, FL.
3. A Binary Variable Model for Affinity Propagation
I.E. Givoni and B.J. Frey

Neural Computation, Vol. 21, No. 6, pp. 1589–1600, June 2009.
2. Matrix Tile Analysis
I.E. Givoni, V. Cheung, and B.J. Frey
Proc. 22nd Conf. on Uncertainty in Artificial Intelligence (UAI), July 2006, Cambridge, MA.
1. Exploring the Mode-of-Action of Bioactive Compounds by Chemical-Genetic Profiling in Yeast
A.B. Parsons*, A. Lopez*, I.E. Givoni*, *et al*.
[*: joint first authors], Cell, Vol. 126, Issue 3, pp. 611-625, August 2006.

Select Invited Talks and Presentations

I regularly give invited talks on Machine Learning, Big Data, career development and mentorship in various venues and to diverse audiences. For a full list please see here. I have also been featured and given interviews in several media outlets, for a full list, please see here. Below are a select list of recent representative invited talks.

ML for Self Driving
Toronto ML Summit, Toronto, January 2018
Robots in the Age of AI
Elevate Toronto, Toronto, Sept 2017
The Future of AI
48Hrs in the Valley, San Francisco, June 2017
A Quick & Dirty Machine Learning Into
SXSW, Austin, TX, March 2017
Applied Machine Learning & Big Data Stories
Georgian Partners' Portfolio Conference, Toronto, October 2016
Big Data for eReading
Ryerson University Dean's Distinguished Visitor Talk Series, Toronto, February 2016
Big Data and Machine Learning [Video]
Computer Fundamentals Plenary Talk, University of Toronto, Nov. 2014, Sept. 2015
Big Data for eBooks and eReading [Video]
Rakuten Technology Conference, Tokyo, November, 2014

Academic Research Experience

Research Assistant - Probabilistic and Statistical Inference (PSI) group, University of Toronto 10.2004 – 09.2011

Thesis: Beyond Affinity Propagation. Extended of the Affinity Propagation algorithm to handle additional data and structure (semi-supervised, multiple-exemplar, capacitated, and hierarchical AP) with applications to user-aided segmentation, motion segmentation, and HIV analysis, Developed alternative inference techniques based on linear programming relaxations and dual decomposition. Developed an improved derivation of the affinity propagation model.
Developed the Flobjects framework - using optical flow to learn about static objects. Applications to object recognition.
Developed tools for MAP inference - efficiently computable high-order functions, connections between Belief Propagation and Graph-Cuts, new approaches for message scheduling.
Contributed to development and derivation of the **Hierarchical Bayesian Stel Model** – a probabilistic generative patch based model separating color from appearance
Derived model and contributed to code development of alternative message passing algorithms for clustering.
Developed **Matrix Tile Analysis**, novel approach for matrix data analysis via non-overlapping tiles
Developed the **Factorgram**, a novel visualization tool for factorization techniques output.

Undergraduate research projects, Hebrew University, Israel

Undergraduate Thesis: Design, implementation, and research into the effects of feedback introduction to a dynamic model of the octopus arm (Israeli Center for Neural Computation)
Computational Biology Project: Designed and implemented proteasome activity prediction web-server (Molecular Genetics & Biotech Dept., Hadassah Medical Center)

Oscar Getz undergraduate summer research program, Weizmann Institute, Israel Summer 2003

Researched visual and barrel cortex responses in the rat using in-vivo intracellular measurements and extended the automated visual stimuli system.

Professional Activities & Service

I am actively engaged in many volunteer and service activities both in academia and industry.
For my contributions to the University of Toronto I am the recipient of the 2017 Arbor Award for alumni volunteer impact. I was recognized in 2018 as one of Canada's 50 inspiring women in STEM.

Academic:

- **Invited lecturer** - variety of Engineering and CS courses.
- **NSERC external reviewer** for grant applications.
- **Research supervisor -** supervised Ph.D., M.Sc., B.Sc./B. Eng. students, capstone & design projects.
- **Reviewer -** Top-tier scientific journals & conferences (eg Neural Comp., NIPS, CVPR, ICML).
- **Teaching Assistant, UofT -** undergraduate & graduate machine learning courses.

Board & Committee memberships:

- **Steering committee member** - Canadian Celebration of Women in Computing (CanCWIC) (2016 - present). Prior to that the event was knowns as as Ontario Celebration of Women In Computing (ONCWIC) where I contributed as volunteer, with sponsorship outreach, and content presenter (2010-2016)
- **Board co-founder, organizer and member at large** - Women in Machine Learning (WiML) workshop, organizer (2009), board co-founder (2009), IT/secretary and active board member, presenter, panelist, mentor, volunteer (2006 - Present)
- **Scientific Advisor** - Next AI Canada (2016 - Present)
- **Committee Member** – UofT steering committee for Data Science program (2016)

Consultancy for Startups

- Privasee AI
- Whistle.com

Community Building & Mentorship

- **Co-founder and Co-organizer -** ML Ensemble **-** semi-annual event for ML practitioners and academics in Toronto (2017-Present)
- **Co-organizer** - Canadian Tech @ Scale - annual event for Engineering Leaders in Toronto (2018 - Present), previously panelist and speaker.
- **Mentor** - official (UofT CS Mentorship program) and non-official individual mentoring, mostly for women in STEM. I also regularly attend mentoring events, career panels, etc. For a full list please see here.

Recruiting, Promotion & Retention activities for Women in Computer Science and STEM:

- **Tech Ladies @ Kobo** - established and ran the group's monthly meetings, created and delivered company wide training on unconscious bias and improved hiring and retention strategies for diversity (2013-2016);
- **Regular speaker** in at Girls in Tech Toronto, Girl Geeks Toronto, WISE, and other organizations.

- **Recruiting and screening** - introduced multiple initiatives at Kindred, Kobo and Altera, including introduction of new **recruiting and screening processes** and interest group sponsorships and collaborations (2012-present); Organized **resume clinics** (February 2012) and **interview clinics** (October 2012) for Women in Science and Engineering (WISE) ;
- Google Global Community scholar, Google GRAD CS forum scholar; Presented at the Grace Hopper Celebration (GHC) of women in computing conferences; Multiple scholarship recipient to attend & present at GHC and CRA-W Grad cohort.

Youth Outreach:

- "AI and Machine Learning" – guest lecture at 12th grade philosophy course, Marc Garneau Collegiate Institute, May 2015, "Machines That Learn" - Machine learning workshop for high school students, Annual Gifted Students Conference February 2011-2015; UofT CS education week, December 2010; Gr8 designs for Gr8 girls Group leader - November 2011, April 2010. "Embracing Uncertainty" – The Royal Society's 350 anniversary Summer Science Exhibition, Presented at the Microsoft Research Display, London, UK, June 2010