

# Jaymin Daniel Mankowitz (Daniel J. Mankowitz\*)

\*publication name

## PERSONAL DETAILS

Date of birth: **01-07-1986**  
Nationality: **Israeli, South African**  
Languages: **English** (Native), **Hebrew** (Fluent), **Mandarin Chinese** (Intermediate), **Afrikaans** (Intermediate)  
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## GOOGLE FELLOWSHIP AWARD

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| Google PhD Fellowship Recipient | 2016 |
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*Selected among 9 Machine Learning Researchers from around the world by Google for this award*

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## TECHNICAL SKILLS

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| Programming Languages  | Additional expertise  | Platforms and Applications   |
|--|---|--|
| C++, C, Java, Android Java, iOS, Matlab, Python, Lua, Tensorflow | OpenCV, Robot Operating System (ROS), PHP, MySQL, HTML, XML | Linux, Windows, Eclipse, Netbeans, Java Enterprise Edition (JEE), Glassfish, Latex |

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## EDUCATION

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| University                                    | Degree  | Grade                      | Duration                 |
|---|---|----------------------------|--------------------------|
| Technion, Israel Institute of Technology      | PhD Reinforcement Learning  | 97.5% ( <i>Pending</i> )   | March 2014-February 2018 |
| University of Edinburgh, Scotland             | MSc Artificial Intelligence<br>Specializing in Robotics, Machine Learning and Computer Vision | 84% ( <i>Distinction</i> ) | Sept. 2011 – Sept. 2012  |
| University of the Witwatersrand, South Africa | BEng (Honours) Electrical Engineering   | 82% ( <i>Distinction</i> ) | Jan. 2007 – Nov. 2010    |
| Tel Aviv University, Israel                   | Mechina Program   | 89% ( <i>Distinction</i> ) | Sept. 2005 – Jul. 2006   |

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## EMPLOYMENT HISTORY

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| Company                     | Position                  | Key Responsibilities   | Duration            |
|-----------------------------|---------------------------|--|---------------------|
| Google Deepmind, London, UK | Senior Research Scientist | Working on incorporating Reinforcement Learning into Google-scale problems | August 2020-present |

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|---|-------------------------------|--|-------------------------------------|
| Google Deepmind, London, UK   | Research Scientist            | Working on incorporating Reinforcement Learning into Google-scale problems                                       | April 2018-August 2020              |
| Google Deepmind, London, UK   | Research Scientist Intern     | I worked in David Silver's RL team on Hierarchical Reinforcement Learning algorithms                             | July 2017-October 2017              |
| WalmartLabs, Sunnyvale, California  | Research Scientist Intern     | Working for the eCommerce Team at Walmart developing active learning and Reinforcement Learning algorithms       | June 2016 – October 2016            |
| Fitterli ( <a href="http://www.fitterli.com">www.fitterli.com</a> ), Israel | Co-Founder                    | Business development, customer relations, technological development  | (1 year, 8 months)<br>2014-2015     |
| Technion, Machine Learning Group, Haifa, Israel                             | Research Associate            | Developing State-of-the-art Reinforcement Learning Algorithms  | (1 year)<br>2013-2014               |
| Team ROBIL, ROBIL-2, DARPA Robotics Challenge, Israel                       | Robotics Software Developer   | Developed object recognition algorithms for an <i>Atlas</i> humanoid robot. Developed Visual Odometry algorithms | (1 year, 4 months)<br>2013-2014     |
| No.3 High School, Haerbin, China  | Middle School Teacher         | TOEFL, GAC Business, ACT Science, Physics, Chemistry and Biology teacher   | (6 months)<br>Mar. 2011 – Aug. 2011 |
| Technion, Control and Robotics Laboratory, Haifa, Israel                    | Research and Developer Intern | Developed a Matlab GUI to control a scooterbot Robot   | (3 months)<br>Nov. 2008 – Jan. 2009 |

#### NOTABLE NON-ACADEMIC ACHIEVEMENTS

**Winner Intel Business Challenge Europe for my startup “Fitterli” (Out of a Pool of 4000 startup projects in Europe), Vilna, Lithuania** (2014)

**Top 25 Finalist (out of a pool of 20,000 startups from around the world), Intel Global Business Challenge for my startup “Fitterli”, Berkeley, USA** (2014)

**Top 8 Finalist BizTec Competition for “Fitterli”, Technion, Israel** (2014)

**Winner Technion 3 Day Startup Competition for “Fitterli”, Technion, Israel** (2014)

**RoboCup 2013 Standard Platform League Participant:** Member of Team Edinferno at the 17th annual RoboCup in Eindhoven, Netherlands. (2013)

**Android Developer Challenge Sub-Saharan Africa Finalist:** I co-developed one of the top ten Android social networking applications in Sub-Saharan Africa (2011)

**Geo-Network Monitor:** I released an Android application onto the Android Market. It has been downloaded in 93 different countries by over 1000 users. (2010)

## NOTABLE ACADEMIC ACHIEVEMENTS

### Technion Israel Institute of Technology

- Google PhD Fellowship Recipient for 2016** – One of 9 Machine Learning researchers from around the world to have received this award (2016)
- Lifelong Learning: A Reinforcement Learning Approach ICML 2017 Workshop** – I co-organized this workshop at ICML 2017 in Sydney Australia. (2017)
- Abstraction in Reinforcement Learning ICML 2016 Workshop** – I co-organized this workshop which took place at ICML 2016 in New York. It had almost 500 registered attendees and was one of the top 5 most popular workshops. (2016)
- Deep Reinforcement Learning Lab** - I have co-founded a Deep RL Lab at the Technion which has currently over 15 projects and more than 30 students. The Lab already has three notable publications to its name. (Sep. 2015-pre sent)

### University of Edinburgh

- Machine Learning and Pattern Recognition Kaggle Competition** - 9<sup>th</sup> place out of 107 students – Goal: Predict the next pixel in an image given previous pixels (2012)
- Winner of the Intelligent Autonomous Robotics Competition** – Goal: Build a robot that localises itself and performs certain navigation tasks in a 5 minute period (2011)

### University of the Witwatersrand

- Entelect Prize** – The most distinguished final year student (Information Engineering Option) (2010)
- Alcom Matomo Prize in Telecommunications** - The final year student who submitted the best design or laboratory project in telecommunications (2010)

## PATENTS

- Richard Chatwin, Daniel Mankowitz, Shie Mannor, Vineet Abhishek, **METHOD AND SYSTEM FOR PROMOTING PRODUCTS IN PRODUCT SEARCH RESULTS USING TRANSFER LEARNING WITH ACTIVE SAMPLING**, 15/413,033, 2016, Patent Pending (2017)
- T Schaul, M Hessel, HP Van Hasselt, DJ Mankowitz, **Continual reinforcement learning with a multi-task agent**, US Patent App. 16/268,414 (2019)

## PUBLICATIONS

- G Dulac-Arnold, N Levine, DJ Mankowitz, J Li, C Paduraru, S Gowal, T. Hester, , **“An empirical investigation of the challenges of real-world reinforcement learning”**, Under review (2020) (2020)
- Caglar Gulcehre, Ziyu Wang, Alexander Novikov, Tom Le Paine, Sergio Gómez Colmenarejo, Konrad Zolna, Rishabh Agarwal, Josh Merel, Daniel Mankowitz, Cosmin Paduraru, Gabriel Dulac-Arnold, Jerry Li, Mohammad Norouzi, Matt Hoffman, Ofir Nachum, George Tucker, Nicolas Heess, Nando de Freitas, **“RL unplugged: Benchmarks for offline reinforcement learning”** (NeurIPS) (2020)
- DJ Mankowitz, N Levine, R Jeong, Y Shi, J Kay, A Abdolmaleki, Y. Shi, T. Hester, M. Riedmiller, **“Robust reinforcement learning for continuous control with model misspecification”**, (ICLR) (2020)

- E Derman, D Mankowitz, T Mann, S Mannor, **"A bayesian approach to robust reinforcement learning"** (2019)  
(UAI)
- G Dulac-Arnold, D Mankowitz, T Hester, **"Challenges of real-world reinforcement learning"** (2019)  
(ICML - RL4RealLife Workshop) **(Best paper award)**
- C. Tessler, D.J Mankowitz, S. Mannor, **"Reward Constrained Policy Optimization."** (ICLR) (2019)
- D. Borsa, A. Barreto, J. Quan, D.J Mankowitz, R. Munos, H. Hasselt, D. Silver, T. Schaul, **"Universal Successor Feature Approximators"**, (ICLR) (2019)
- T. Zahavy, M. Haroush, N. Merlis, D.J Mankowitz, S. Mannor, **"Learn What Not to Learn: Action Elimination with Deep Reinforcement Learning"**(NIPS) (2018)
- E. Derman, D.J Mankowitz, T.A. Mann, S. Mannor, **"Soft-Robust Actor Critic Policy Gradient"** (UAI) (2018)
- A. Barreto, D. Borsa, J. Quan, T. Schaul, D. Silver, M. Hessel, D.J Mankowitz, A. Zidek, R. Munos, **Transfer in deep reinforcement learning using successor features and generalised policy improvement**, (ICML) (2018)
- D.J. Mankowitz, T.A. Mann, P. Bacon, D. Precup, S. Mannor, **"Learning Robust Options"**, (AAAI), New Orleans, USA (2018)
- N. Levin, T. Zahavy, D.J. Mankowitz, A. Tamar, S. Mannor, **"Shallow Updates for Deep Reinforcement Learning"**, (NIPS), Long Beach, California (2017)
- C. Tessler\*, S. Givony\*, T. Zahavy\*, D.J Mankowitz\*, Shie Mannor **"A Deep Hierarchical Approach to Lifelong Learning in Minecraft"**, (AAAI), San Francisco, (2017)
- D.J. Mankowitz, M. Harel, V. Abhishek, R. Chatwin, S. Mannor, **"Active Sampling Transfer learning (ASTral)"**, WalmartLabs & Technion, Under Review (2017)
- D.J Mankowitz, T.A. Mann, Shie Mannor **"Adaptive Skills, Adaptive Partitions (ASAP)"**, Neural Information Processing Systems (NIPS), Barcelona, Spain (2016)
- C. Tessler, S. Givony, T. Zahavy, D.J Mankowitz, Shie Mannor **"A Deep Hierarchical Approach to Lifelong Learning in Minecraft"** IJCAI Deep Reinforcement Learning Workshop, European Workshop on Reinforcement Learning, Barcelona, Spain **(Selected for oral presentation)** (2016)
- D.J Mankowitz, T.A. Mann, Shie Mannor **"Iterative Hierarchical Optimization for Misspecified Problems (IHOMP)"**, European Workshop on Reinforcement Learning, Barcelona, Spain (2016)
- D.J Mankowitz, A. Tamar, Shie Mannor **"Situational Awareness by Risk-Conscious Skills"**, ICML Reliable Machine Learning in the Wild Workshop, New York, USA; European Workshop on Machine Learning, Barcelona, Spain **(Selected for oral presentation)** (2016)
- D.J Mankowitz, T.A. Mann, Shie Mannor **"Bootstrapping Skills"**, In Proc. Reinforcement Learning and Decision Making (RLDM), 2015, Edmonton, Canada **(Selected for oral presentation <15% acceptance)** (2015)

T.A. Mann, D.J. Mankowitz, Shie Mannor ***“Learning when to Switch Between Skills in High Dimensional Domains”***, Workshop on Learning for General Competency in Video Games, AAAI, 2015, Austin, Texas (2015)

D.J. Mankowitz, T.A. Mann, Shie Mannor ***“Time-regularized Interrupting Options”***, In Proc. International Conference on Machine Learning (ICML), 2014, Beijing, China (2014)

D.J. Mankowitz, S. Ramamoorthy ***“BRISK-based Visual Feature Extraction for Resource Constrained Robots”***, In Proc. RoboCup International Symposium, 2013, Eindhoven, Netherlands (2013)

D.J. Mankowitz, A. Pavard: ***“Mobile Device-Based Cellular Network Coverage Analysis Using Crowd Sourcing”***, IEEE Xplore, EUROCON International Conference on the Computer as a Tool, Lisbon, Portugal (2011)

**Theses:**

D.J. Mankowitz, ***“Towards General AI: Learning Options in Hierarchical Reinforcement Learning”*** (2018)  
Technion Israel Institute of Technology, PhD Thesis

D.J. Mankowitz: ***“BRISK-based Visual Landmark Localisation using Nao Humanoid Robots”***, MSc (2012)  
Thesis, University of Edinburgh, Scotland

D.J. Mankowitz: ***“Mobile Device-Based Cellular Network Coverage Analysis Using Crowd Sourcing”***, (2010)  
BEng Thesis, University of the Witwatersrand, Johannesburg, South Africa

**Technical Papers:**

D.J. Mankowitz, E. Rivlin: ***“CFORB: Circular FREAK ORB Visual Odometry”***, Technical Report, Technion, Israel Institute of Technology (2015)

D.J. Mankowitz: ***“A Review and Comparison of the Various Techniques used for Online Simultaneous Localisation and Mapping (SLAM)”***, Technical Report, University of Edinburgh, Scotland (2011)