Steven **James**

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Education

PhD
2017 – 2021

University of the Witwatersrand — *Johannesburg, South Africa*

- Thesis: Learning portable symbolic representations
- Supervisors: Prof Benjamin Rosman and Prof George Konidaris

MSc (Computer Science) with distinction
2014 – 2016

University of the Witwatersrand — *Johannesburg, South Africa*

- Dissertation: The effect of simulation bias on action selection in Monte Carlo tree search
- Supervisors: Dr Pravesh Ranchod, Prof Benjamin Rosman and Prof George Konidaris

BScHons (Computer Science) with distinction
2013

University of the Witwatersrand — *Johannesburg, South Africa*

BSc (Computer Science, Computational & Applied Mathematics) with distinction
2010 – 2012

University of the Witwatersrand — *Johannesburg, South Africa*

Work Experience

School of Computer Science & Applied Mathematics, University of the Witwatersrand
2022 – Present

Lecturer

- COMS1018A: Introduction to Algorithms & Programming — ± 350 students
- COMS3035A: Advanced Analysis of Algorithms — ± 200 students
- Co-lecturer for COMS4047A: Special Topics (Reinforcement Learning) — ± 40 students
- Postgraduate supervision of MSc students — 5 in-progress
- First year coordinator
- Postgraduate presentation coordinator
- Computer Science tutor coordinator
- Competitive programming interest group coordinator
- Various MSc proposal defence panels
- Internal/external reviewer for MSc dissertations

School of Computer Science & Applied Mathematics, University of the Witwatersrand
September 2017 – December 2021

Associate Lecturer

- COMS1018A: Introduction to Algorithms & Programming — ± 350 students
- COMS3035A: Advanced Analysis of Algorithms — ± 200 students
- Co-lecturer for COMS4047A: Special Topics (Reinforcement Learning) — ± 40 students
- Postgraduate supervision of MSc students — 3 graduated, 5 in-progress
- Postgraduate supervision of Honours students — 14 graduated, 12 in-progress
- Supervision of 3rd year software design projects
- First year coordinator (since 2021)
- Postgraduate presentation coordinator
- Computer Science tutor coordinator
- Wits integrated experience in science (WIES)
- Competitive programming interest group coordinator
- Various MSc proposal defence panels
- Internal/external reviewer for MSc dissertations

School of Computer Science & Applied Mathematics, University of the Witwatersrand
January 2017 – September 2017

Sessional Lecturer

- COMS1018A: Introduction to Algorithms & Programming — ± 250 students

Touchsides, Johannesburg
2015 – 2016

Android Developer

- Responsible for delivering Android applications related to the insurance industry, and integrating said applications into the existing backend and proprietary hardware systems.

Associated Computer Solutions, Johannesburg *2014 – 2017*

Developer

- Part of a small R&D team responsible for rewriting components of an ERP suite, including replacing the existing Telnet connection to the server with SSL, as well as providing a mechanism for session recovery should the connection be lost. Also responsible for rewriting the entire front-end in JavaFX to be used on multiple platforms.

School of Computer Science, University of the Witwatersrand *2012 – 2014*

Tutor

- Responsible for setting and conducting tutorials and lab sessions as well as marking test scripts.

Academic Service and Memberships

Deep Learning IndabaX, Durban *2019*

Organising Committee

- For more information, see `https://indabax.co.za/2019`

Journal and Conference Reviewing *2017 – Present*

Reviewer and Program Committee

• International Conference on Machine Learning	(2018 – 2020, 2022)
• International Joint Conference on Artificial Intelligence	(2017, 2018)
• International Conference on Learning Representations	(2018, 2021)
• Neural Information Processing Systems	(2017 – 2021)
• International Conference On Autonomous Agents and Multi-Agent Systems	(2017)
• International Conference on Development and Learning	(2018)
• Conference on Robot Learning	(2019)
• International Conference on Robotics and Automation	(2019, 2020)
• IEEE Robotics and Automation Letters	(2020)
• Journal of AI Research	(2019, 2021, 2022)
• Elsevier Information Sciences	(2020, 2021)

Membership

Association for the Advancement of Artificial Intelligence (AAAI) *2017 –*

Funding and Grants

2019 – 2021	**NRF Thuthuka Grant**, PhD track	*± R687 000*
2018 – 2020	**Google Africa PhD Fellowship**, in the domain of machine learning	*$30 000*

Awards and Scholarships

2018	**Google Africa PhD Fellowship**, in the domain of machine learning
2017	**PV Tobias Educational Bursary**, awarded to academically excellent candidates
2013	**Chancellor's Gold Medal**, most distinguished graduate of the year
2013	**Samuel Goodman Memorial Medal**, most distinguished Honours graduate in the Faculty of Science
2013	**Liberty Life Gold Medal**, outstanding performance in Computer Science Honours
2012	**Liberty Life Gold Medal**, outstanding performance in Computer Science III
2012	**Computer Science School Prize**, highest mark in Computer Science III
2011	**Liberty Life Silver Medal**, outstanding performance in Computer Science II
2011	**Computer Science School Prize**, highest mark in Computer Science II
2011	**Computational & Applied Mathematics School Prize**, outstanding achievement in Computational & Applied Mathematics II
2010	**Liberty Life Bronze Medal**, outstanding performance in Computer Science I
2010	**Computer Science School Prize**, highest mark in Computer Science I

Select Presentations

Indaba𝕏 Namibia — *Online*

Panel Discussion: Current and Future Research in Machine Learning — *October 2021*

International Conference on Machine Learning — *Online*

Learning Portable Representations for High-Level Planning — *July 2020*

Object-Oriented Learning: Perception, Representation, and Reasoning Workshop at ICML — *Online*

Learning Object-Centric Representations for High-level Planning in Minecraft — *July 2020*

MIT Lab Talk — *Online*

Learning Portable Representations for High-Level Planning — *June 2020*

International Conference on Machine Learning — *Long Beach, USA*

Composing Value Functions in Reinforcement Learning — *June 2019*

ICML/IJCAI/AAMAS 2018 Workshop on Planning and Learning — *Stockholm, Sweden*

Learning to Plan with Portable Symbols — *July 2018*

AAAI Conference on Artificial Intelligence — *San Francisco, USA*

An Analysis of Monte Carlo Tree Search — *Feburary 2017*

Publications

Peer-Reviewed Journals and Conferences

[1] M. Beukman, C. Cleghorn, and **S. James**. Procedural content generation using neuroevolution and novelty search for diverse video game levels. In *Genetic and Evolutionary Computation Conference*, 2022.

[2] **S. James**, B. Rosman, and G. Konidaris. Autonomous learning of object-centric abstractions for high-level planning. In *International Conference on Learning Representations*, 2022.

[3] G. Nangue Tasse, **S. James**, and B. Rosman. Generalisation in lifelong reinforcement learning through logical composition. In *International Conference on Learning Representations*, 2022.

[4] N. Kooverjee, **S. James**, and T. Van Zyl. Investigating transfer learning in graph neural networks. *Electronics*, 11(8):1202, 2022.

[5] G. Nangue Tasse, **S. James**, and B. Rosman. A Boolean task algebra for reinforcement learning. In *Advances in Neural Information Processing Systems*, 2020.

[6] **S. James**, B. Rosman, and G. Konidaris. Learning portable representations for high-level planning. In *International Conference on Machine Learning*, 2020.

[7] A. Pretorius, E. Van Biljon, B. van Niekerk, R. Eloff, M. Reynard, **S. James**, B. Rosman, H. Kamper, and S. Kroon. If dropout limits trainable depth, does critical initialisation still matter? A large-scale statistical analysis on relu networks. *Pattern Recognition Letters*, 2020.

[8] M. Cockcroft, S. Mawjee, **S. James**, and P. Ranchod. Learning options from demonstration using skill segmentation. In *2020 International SAUPEC/RobMech/PRASA Conference*. IEEE, 2020.

[9] N. Kooverjee, **S. James**, and T. Van Zyl. Inter- and intra-domain knowledge transfer for related tasks in deep character recognition. In *2020 International SAUPEC/RobMech/PRASA Conference*. IEEE, 2020.

[10] K. Paupamah, **S. James**, and R. Klein. Quantisation and pruning for neural network compression and regularisation. In *2020 International SAUPEC/RobMech/PRASA Conference*. IEEE, 2020.

[11] B. van Niekerk, **S. James**, A. Earle, and B. Rosman. Composing value functions in reinforcement learning. In *International Conference on Machine Learning*, pages 6401–6409, 2019.

[12] **S. James**, G. Konidaris, and B. Rosman. An analysis of Monte Carlo tree search. In *Thirty-First AAAI Conference on Artificial Intelligence*, 2017.

Peer-Reviewed Workshops and Symposia

[13] **S. James**, B. Rosman, and G. Konidaris. Learning abstract and transferable representations for planning. In *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making*, 2022.

[14] G. Nangue Tasse, **S. James**, and B. Rosman. World value functions: knowledge representation for multitask reinforcement learning. In *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making*, 2022.

[15] N. Michlo, D. Jarvis, R. Klein, and **S. James**. Accounting for the sequential nature of states to learn representations in reinforcement learning. In *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making*, 2022.

[16] M. Beukman, M. Mitchley, D. Wookey, **S. James**, and G. Konidaris. Adaptive online value function approximation with wavelets. In *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making*, 2022.

[17] G. Nangue Tasse, **S. James**, and B. Rosman. Generalisation in lifelong reinforcement learning through logical composition. In *Deep RL Workshop at NeurIPS*, 2021.

[18] V. Cohen, G. Nangue Tasse, N. Gopalan, **S. James**, M. Gombolay, and B. Rosman. Learning to follow language instructions with compositional policies. In *AAAI Fall Symposium on AI for Human-Robot Interaction*, 2021.

[19] **S. James**, B. Rosman, and G. Konidaris. Learning object-centric representations for high-level planning in Minecraft. In *Object-Oriented Learning: Perception, Representation, and Reasoning. Workshop at ICML.* 2020.

[20] G. Nangue Tasse, **S. James**, and B. Rosman. Logical composition for lifelong reinforcement learning. In *4th Lifelong Learning Workshop at ICML*, 2020.

[21] G. Nangue Tasse, **S. James**, and B. Rosman. A Boolean task algebra for reinforcement learning. In *Beyond "Tabula Rasa" in Reinforcement Learning: Agents that remember, adapt, and generalize. Workshop at ICLR.* 2020.

[22] **S. James**, B. Rosman, and G. Konidaris. Learning to plan with portable symbols. In *ICML/IJCAI/AAMAS 2018 Workshop on Planning and Learning*, 2018.

[23] B. van Niekerk, **S. James**, A. Earle, and B. Rosman. Will it blend? Composing value functions in reinforcement learning. In *The 2nd Lifelong Learning: A Reinforcement Learning Approach Workshop, FAIM.* 2018.

[24] **S. James**. Learning portable symbolic representations. In *2018 IJCAI Doctoral Consortium*, 2018.

[25] **S. James**, B. Rosman, and G. Konidaris. An investigation into the effectiveness of heavy rollouts in UCT. In *General Intelligence in Game-Playing Agents (GIGA'16) Workshop at IJCAI*, 2016.

Technical Reports and Theses

[26] N. Michlo, **S. James**, and R. Klein. Data overlap: a prerequisite for disentanglement. *arXiv:2202.13341*, 2022.

[27] M. Beukman, **S. James**, and C. Cleghorn. Towards objective metrics for procedurally generated video game levels. *arXiv preprint arXiv:2201.10334*, 2022.

[28] **S. James**. *Learning portable symbolic representations*. PhD thesis, University of the Witwatersrand, Johannesburg, South Africa, 2021.

[29] C. Bester, **S. James**, and G. Konidaris. Multi-pass Q-networks for deep reinforcement learning with parameterised action spaces. *arXiv preprint arXiv:1905.04388*, 2019.

[30] **S. James**. *The effect of simulation bias on action selection in Monte Carlo tree search*. Master's thesis, University of the Witwatersrand, Johannesburg, South Africa, 2016.