This is a draft version only. Do not submit to any funding organization. Only the final version from the History page can be submitted.



Dr. David Churchill

Correspondence language: English Sex: Male Date of Birth: 5/25 Canadian Residency Status: Canadian Citizen Country of Citizenship: Canada

Contact Information

The primary information is denoted by (*)

Address

Primary Affiliation (*)

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Protected when completed

Dr. David Churchill

Language Skills

Language	Read	Write	Speak	Understand	Peer Review
English	Yes	Yes	Yes	Yes	Yes
French	Yes	Yes	Yes	Yes	No

Degrees

2009/9 - 2016/11	Doctorate, Doctor of Philosophy, Computing Science, University of Alberta Degree Status: Completed Thesis Title: Heuristic Search Techniques for Real-Time Strategy Games
	Areas of Research: Algorithms, Computer Science and Statistics
	Research Disciplines: Computer Science
	Supervisors: Michael Buro, 2010/9 - 2016/10
	Fields of Application: Communication and Information Technologies
2006/9 - 2008/12	Master's Thesis, Masters of Science, Computer Science, Memorial University of Newfoundland Degree Status: Completed Thesis Title: Homing in Scale Space
	Areas of Research: Computer Science and Statistics, Robotics and Automation
	Research Disciplines: Computer Science
	Supervisors: Andrew Vardy, 2006/9 - 2008/12
2001/9 - 2005/5	Bachelor's Honours, Bachelor of Science, Computer Science, Memorial University of Newfoundland Degree Status: Completed Thesis Title: Algorithms for the Construction of Generalized Skolem-Type Sequences
	Areas of Research: Algorithms
	Research Disciplines: Computer Science, Pure Mathematics
	Supervisors: Nabil Shalaby, 2001/9 - 2005/5; Manrique Mata-Montero, 2001/9 - 2005/5
	Fields of Application: Communication and Information Technologies

Recognitions

2022/9	Best Paper Award International Conference on the Foundations of Digital Games (FDG) Prize / Award Publication: "The Effects of Human-like Modifications to Heuristic Action Evaluation in Video Game Pathfinding"
2022/1 - 2022/12	President's Award for Outstanding Teaching (Faculty) - 5,000 (Canadian dollar) Memorial University of Newfoundland Prize / Award Open to those who hold a full-time tenured or tenure-track faculty appointment at any campus of Memorial University for a minimum of five continuous years and have not more than 10 years overall teaching experience (includes full-time faculty appointments in the Faculty of Medicine and at the Marine Institute).
2017/9 - 2018/8	Teaching Excellence Award Memorial University of Newfoundland Prize / Award Awarded by the Memorial University Computer Science Society by student vote
2015/11	Best Student Paper AAAI Conference on AI and Interactive Digital Entertainment Prize / Award Publication: "Hierarchical Portfolio Search: Prismata's Robust AI Architecture for Games with Large Search Spaces"
2015/3	International Game Developer's Association Scholarship - 3,000 (Canadian dollar) International Game Developer's Association Prize / Award Scholarship awarded by the IGDA for outstanding achievement in video game development and research
2013/10	1st Place: 2013 AIIDE Starcraft AI Competition (Canadian dollar) AIIDE Starcraft AI Competition Prize / Award Winner of the 2013 Starcraft AI Competition, an international competition for artificial intelligence
2013/9	Best Paper: 2013 Conference on Computational Intelligence in Games (Canadian dollar) IEEE Prize / Award Best Paper Award
2011/12	2nd Place: Best Presentation, 2011 Pan Alberta Computing Science Conference (Canadian dollar) University of Alberta Prize / Award 2nd Place: Best Presentation
2011/9 - 2012/8	President's Doctoral Prize of Distinction - 5,100 (Canadian dollar) University of Alberta Distinction Financial award for outstanding students in Computing Science at the University of Alberta
2011/2	Computing Science Departmental Top-Up - 5,000 (Canadian dollar) University of Alberta Prize / Award Financial award for outstanding students in Computing Science at the University of Alberta

2010/9 - 2011/8	President's Doctoral Prize of Distinction - 5,100 (Canadian dollar) University of Alberta Distinction Financial award for outstanding students in Computing Science at the University of Alberta
2010/1 - 2010/8	President's Doctoral Prize of Distinction - 10,000 (Canadian dollar) University of Alberta Distinction Financial award for outstanding students in Computing Science at the University of Alberta

User Profile

Researcher Status: Researcher

Employment

2022/6	Game AI Consultant Trophi AI Part-time AI / Game Programming, Proof of Concept creation, general AI consulting
2016/9	Associate Professor, Computer Science Computer Science, Memorial University of Newfoundland Full-time, Associate Professor Tenure Status: Tenure Track
2017/5 - 2017/9	Game AI Consultant Google DeepMind / Blizzard Entertainment Part-time Consulted with Blizzard Entertainment and Google DeepMind on the creation of the StarCraft II AI API. Created the StarCraft AI Bot: CommandCenter for release along with the API
2016/8 - 2017/3	Game Al Consultant Facebook Al Research, Facebook Part-time Consulting on F.A.I.R. Starcraft Al research project
2014/1 - 2017/1	Lead AI Programmer Lunarch Studios Part-time Designed and Implemented an Artificial Intelligence system for the online strategy game Prismata by Lunarch Studios.
	Areas of Research: Algorithms
2005/5 - 2006/8	Geophysical Simulation & Visualization Programmer Department of Earth Sciences, Memorial University of Newfoundland Full-time Designed and implemented algorithms and user interfaces for geophysical and seismic applications / visualization.

Affiliations

The primary affiliation is denoted by (*)

(*) 2016/9 Assistant Professor, Computer Science, Memorial University of Newfoundland

Research Funding History

Awarded	[n=5]
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2017/5 - 2024/5 NSERC Discovery Grant, Grant Principal Investigator Project Description: Artificial Intelligence Research at Memorial University. Founded the MUN AI & Games Lab. Received 1 year COVID extension + 1 year Early Career Researcher extension. **Funding Sources:** 2017/5 - 2022/5 Natural Sciences and Engineering Research Council of Canada (NSERC) **Discovery Grant** Total Funding - 140,000 (Canadian dollar) Portion of Funding Received - 140,000 (Canadian dollar) Funding Competitive?: Yes 2017/9 - 2020/8 ACOA / Innovate NL - Memorial University AI Lab, Grant Principal Investigator Project Description: Establishing an Artificial Intelligence Research Lab at Memorial University of Newfoundland, focusing on developing AI for video games and robotics **Funding Sources:** Atlantic Canada Opportunities Agency Total Funding - 127,000 (Canadian dollar) Portion of Funding Received - 127,000 (Canadian dollar) Funding Competitive?: Yes 2016/9 - 2019/8 Memorial University Start-Up Grant, Grant Principal Investigator **Funding Sources:** Memorial University of Newfoundland Total Funding - 40,000 (Canadian dollar) Portion of Funding Received - 40,000 (Canadian dollar) Funding Competitive?: No 2017/10 - 2018/9 Google DeepMind Research Grant, Grant Principal Investigator Project Description: Google DeepMind Research Grant for AI research **Funding Sources:** Google DeepMind Total Funding - 20,000 (Canadian dollar) Portion of Funding Received - 20,000 (Canadian dollar) Funding Competitive?: No 2017/8 - 2018/1 Facebook AI Research Grant, Grant, Equipment Principal Investigator Project Description: Facebook AI Research grant for computer hardware to conduct AI research **Funding Sources:** Facebook AI Research Total Funding - 12,000 (United States dollar) Portion of Funding Received - 12,000 (Canadian dollar) Funding Competitive?: No

Completed [n=2]

2012/9 - 2014/8 Queen Elizabeth II Scholarship, Scholarship Principal Applicant

Funding Sources:

2012/9 - 2014/8	University of Alberta
	Queen Elizabeth II Scholarship
	Total Funding - 30,000 (Canadian dollar)
	Portion of Funding Received - 30,000 (Canadian dollar)
	Funding Competitive?: Yes

2009/9 - 2012/8 NSERC PGS-D, Scholarship

Principal Applicant Funding Sources:

2009/9 - 2012/8 Natural Sciences and Engineering Research Council of Canada (NSERC) PGS-D Total Funding - 63,000 (Canadian dollar) Portion of Funding Received - 63,000 (Canadian dollar) Funding Competitive?: Yes

Courses Taught

2024/01/01 - 2024/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP 6980 Course Topic: Artificial Intelligence Course Level: Graduate Academic Session: Winter Number of Students: 33
2023/09/01 - 2023/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Introduction to Game Programming Course Code: COMP 4300 Course Level: Undergraduate Academic Session: Fall Number of Students: 56
2023/09/01 - 2023/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP 3200 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Fall Number of Students: 67
2023/01/01 - 2023/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP 6980 Course Topic: Artificial Intelligence Course Level: Graduate Academic Session: Winter Number of Students: 31

2023/01/01 - 2023/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Artificial Intelligence for Video Games Course Code: COMP4303 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Winter Number of Students: 41
2022/09/01 - 2022/12/21	Professor, Computer Science, Memorial University of Newfoundland Course Title: Introduction to Game Programming Course Code: COMP 4300 Course Level: Undergraduate Academic Session: Fall
2022/09/01 - 2022/12/21	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP3200 Course Level: Undergraduate Academic Session: Fall
2022/01/01 - 2022/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Artificial Intelligence for Video Games Course Code: COMP 4303 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Winter
2021/09/01 - 2021/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP3200 Course Level: Undergraduate Academic Session: Fall
2021/09/01 - 2021/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP 6980 Course Topic: Artificial Intelligence Course Level: Graduate Academic Session: Fall
2021/09/01 - 2021/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Introduction to Game Programming Course Code: COMP4300 Course Level: Undergraduate Academic Session: Fall
2021/09/01 - 2021/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Artificial Intelligence for Video Games Course Code: COMP 4303 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Winter Number of Students: 57

2020/09/01 - 2020/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP 6980 Course Topic: Artificial Intelligence Course Level: Graduate Academic Session: Fall Number of Students: 17
2020/09/01 - 2020/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Introduction to Game Programming Course Code: COMP 4300 Course Topic: Programming Course Level: Undergraduate Academic Session: Fall Number of Students: 72
2020/09/01 - 2020/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Artificial Intelligence Course Code: COMP 3200 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Fall Number of Students: 73
2020/01/01 - 2020/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Artificial Intelligence in Computer Games Course Code: COMP 4303 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Winter Number of Students: 42 Lecture Hours Per Week: 3
2020/01/01 - 2020/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Group Project Course Code: COMP 4770 Course Topic: Software Engineering Course Level: Undergraduate Academic Session: Winter Number of Students: 16
2019/09/01 - 2019/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Smart Systems Course Code: COMP 3200 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Fall Number of Students: 50 Lecture Hours Per Week: 3
2019/09/01 - 2019/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Introduction to Game Programming Course Code: COMP 4300 Course Topic: Programming Course Level: Undergraduate Academic Session: Fall Number of Students: 43

2019/01/01 - 2019/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Group Project Course Code: COMP 4770 Course Topic: Software Engineering Course Level: Undergraduate Academic Session: Winter Number of Students: 44 Lab Hours Per Week: 5
2018/09/01 - 2018/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Smart Systems Course Code: COMP 3200 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Fall Number of Students: 42 Lecture Hours Per Week: 3
2018/09/01 - 2018/12/31	Professor, Computer Science, Memorial University of Newfoundland Course Title: Introduction to Game Programming Course Code: COMP 4300 Course Topic: Programming Course Level: Undergraduate Academic Session: Fall Number of Students: 75 Lecture Hours Per Week: 3 Lab Hours Per Week: 3
2018/01/01 - 2018/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Group Project Course Code: COMP 4770 Course Topic: Software Engineering Course Level: Undergraduate Academic Session: Winter Number of Students: 35 Lab Hours Per Week: 5
2018/01/01 - 2018/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Algorithmic Techniques for Smart Systems Course Code: COMP 3200 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Winter Number of Students: 19 Lecture Hours Per Week: 3
2017/01/01 - 2017/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Computational Intelligence Course Code: COMP4752 Course Topic: Artificial Intelligence Course Level: Undergraduate Academic Session: Winter Number of Students: 21 Lecture Hours Per Week: 3

2017/01/01 - 2017/04/30	Professor, Computer Science, Memorial University of Newfoundland Course Title: Intro to Scientific Programming Course Code: COMP1510 Course Topic: Programming Course Level: Undergraduate Academic Session: Winter Number of Students: 16 Lecture Hours Per Week: 3
Course Develop	ment
2020/1	Professor, Computer Science, Memorial University of Newfoundland Course Title: COMP 4303 - AI for Video Games Course Level: Undergraduate This is a course for students interested in learning about various techniques for Artificial Intelligence in Computer Games. Topics include an introduction to: movement in games, search and planning, decision making, and procedural content generation. Implementation of course assignments and project will be done using the C++ programming language and the SFML graphics library.
2018/9	Professor, Computer Science, Memorial University of Newfoundland Course Title: COMP 4300 - Introduction to Game Programming Course Level: Undergraduate This is a course for students interested in learning the fundamentals of game programming and game engine architecture. Topics include an introduction to: vector math for games, rendering, animation, and artificial intelligence, collision detection, game physics, and user-interfaces. Students will be writing fully functional games using the C++ programming language and the SFML graphics library.
2018/1	Professor, Computer Science, Memorial University of Newfoundland Course Title: COMP 3200 - Algorithmic Techniques for Smart Systems Course Level: Undergraduate This course is an introduction to Artificial Intelligence, covering algorithmic techniques and data structures used in modern problem-solving environments. Each topic will have a related assignment where the learned techniques are applied to simple video games.

Program Development

Co-Developer, Computer Science, Memorial University of Newfoundland Program Title: Masters in Artificial Intelligence Course Level: Graduate

Student/Postdoctoral Supervision

Bachelor's Honours [n=6]

2023/9 - 2024/4	Benjamin Stanley (Completed), Memorial University
Principal Supervisor	Student Degree Start Date: 2023/9
	Student Degree Received Date: 2024/4
	Thesis/Project Title: Search Ordering for StarCraft Build Order Optimization
	Present Position: Unknown

2023/1 - 2023/4 Principal Supervisor	Zakwan Ashfaq Zian (Completed), Memorial University Student Degree Start Date: 2023/1 Student Degree Received Date: 2023/4 Thesis/Project Title: Performance analysis of optimized A-Star and iterative deepening A- Star algorithm with distance and custom heuristics Present Position: Unknown
2023/1 - 2023/4 Principal Supervisor	Jacob Critch (Completed) , Memorial University Student Degree Start Date: 2023/1 Student Degree Received Date: 2023/4 Thesis/Project Title: Comparison of Reinforcement Learning Hyperparameters in the 3D Game Rocket League Present Position: Unknown
2023/1 - 2023/4 Principal Supervisor	Collin Riggs (Completed), Memorial University Student Degree Start Date: 2023/1 Student Degree Received Date: 2023/4 Thesis/Project Title: Chokepoint Detection and Wall-In Building Placement in StarCraft Present Position: Unknown
2021/1 - 2021/4 Principal Supervisor	Christopher Yates (Completed), Memorial University Student Degree Start Date: 2021/1 Student Degree Received Date: 2021/4 Thesis/Project Title: The use of Poisson Disc Distribution and A* Pathfinding for Procedural Content Generation in Minecraft Present Position: Unknown
2017/1 - 2017/4 Principal Supervisor	Richard Kelly (Completed), Memorial University Student Degree Start Date: 2017/1 Student Degree Received Date: 2017/3 Thesis/Project Title: Comparison of Monte Carlo Tree Search Methods in the Imperfect Information Card Game Cribbage Present Position: Unknown
Master's Thesis [n=7]
2021/9 - 2024/4 Principal Supervisor	Andrew Nash (Completed), Memorial University Student Degree Start Date: 2021/9 Student Degree Received Date: 2024/4 Thesis/Project Title: Herd's Eye View: Improving Game AI Agent Learning with Collaborative Perception
2019/9 Principal Supervisor	Shawn Sabraw (In Progress), Memorial University Student Degree Start Date: 2019/9 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: Generating AutoPlay Video Game Levels Using Genetic Algorithms
2019/1 - 2023/4 Principal Supervisor	Robert Bishop (Completed) , Memorial University Student Degree Start Date: 2019/1 Student Degree Received Date: 2023/4 Student Canadian Residency Status: Permanent Resident Thesis/Project Title: The Effects of Human-like Modifications to Heuristic Action Evaluation in Video Game Pathfinding

2018/9 - 2021/10 Principal Supervisor	Lucas Critch (Completed), Memorial University Student Degree Start Date: 2018/9 Student Degree Received Date: 2021/10 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: Using Influence Maps with Heuristic Search to Craft Sneak-Attacks in Starcraft
2017/9 - 2021/5 Principal Supervisor	Richard Kelly (Completed), Memorial University Student Degree Start Date: 2017/9 Student Degree Received Date: 2021/5 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: Component-Action Deep Q-Learning for Real-Time Strategy Game AI
2017/9 - 2019/9 Principal Supervisor	Rory Campbell (Completed), Memorial University Student Degree Start Date: 2017/9 Student Degree Received Date: 2019/9 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: Machine Learning State Evaluation in Prismata
2017/9 - 2019/9 Co-Supervisor	Caroline Strickland (Completed), Memorial University Student Degree Start Date: 2017/9 Student Degree Received Date: 2019/9 Student Canadian Residency Status: Canadian Citizen Thesis/Project Title: A Reinforcement Learning Approach to Multi-Robot Planar Construction

Journal Review Activities

2019/9 Reviewer, IEEE Transactions on Computational Intelligence and AI in Games Number of Works Reviewed / Refereed: 1

Conference Review Activities

Reviewer, International Conference on Robotics and Biometrics Reviewer, IEEE/RSJ International Conference on Intelligent Robots and Systems Reviewer, International Conference on Robotics and Automation Reviewer, IEEE Conference on Computational Intelligence and Games Reviewer, International Computing and Combinatorics Conference Reviewer, International Joint Conference on Artificial Intelligence Reviewer, Canadian Conference on Electrical and Computer Engineering Reviewer, International Conference on Image Processing Reviewer, AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment

Community and Volunteer Activities

APICS Programming Competition Team Organizer, Memorial University of Newfoundland
 Jr. High Robotics Camp Instructor, Memorial University of Newfoundland
 Instructed a class of Jr. High students on topics such as programming, and robotics.

 2011/10 - 2016/9 AIIDE Starcraft AI Competition Organizer, University of Alberta Organized and ran the annual AIIDE Starcraft AI Competition from 2011 to present. This is an international competition for Artificial Intelligence in Real-Time Strategy Games.
 2011/9 - 2012/8 Vice President - Computing Science Graduate Student Association, University of Alberta
 2005/9 - 2006/8 President - Computer Science Society, Memorial University of Newfoundland
 2002/9 - 2003/8 President - Mathematics & Statistics Society, Memorial University of Newfoundland

International Collaboration Activities

2016/8 - 2017/9 Research Consultant, United States of America Conducted research part-time as a consultant for Facebook AI Research (FAIR) located in New York City under supervision of Gabriel Synnaeve. Research was on the topic of artificial intelligence for Starcraft.

Committee Memberships

2017/9	Committee Member, Science Atlantic Computer Science Committee, Memorial University of Newfoundland
2016/9	Chair, Memorial University Computer Science Programming Competition Committee, Memorial University of Newfoundland Organize, run, and coach the MUN Computer Science Programming Competitions
2016/9	Committee Member, Memorial University Computer Science Graduate Studies Committee, Memorial University of Newfoundland
2017/1 - 2019/9	Committee Member, Computer Science Search Committee, Memorial University of Newfoundland
2011/9 - 2012/8	Committee Member, Computing Science Graduate Student Advisory, University of Alberta

Presentations

- (2017). Playing Your Cards Right: The Hierarchical Portfolio Search Al of 'Prismata'. 2017 Game Developer's Conference (GDC), San Francisco, United States of America Invited?: Yes, Competitive?: Yes
- 2. (2015). Game Programming & Technology Panel. Game Discovery Exhibition, Edmonton, AB, Canada Main Audience: General Public Invited?: Yes, Keynote?: No, Competitive?: No
- 3. (2015). AIIDE Starcraft AI Competition Report and Results. Artificial Intelligence and Interactive Digital Entertainment Conference, Varies, United States of America Main Audience: Researcher Invited?: Yes, Keynote?: No, Competitive?: No Description / Contribution Value: Annual presentation of report and results from the AIIDE Starcraft AI Competition. Annual invitation 2011-2015
- 4. (2014). Greedy Monte-Carlo for Real-Time Strategy Games. 2014 Game Developer's Conference (GDC), San Francisco, CA, United States of America Main Audience: Knowledge User Invited?: Yes, Keynote?: No, Competitive?: No

- (2013). Artificial Intelligence for StarCraft. Japan National Institute of Informatics, Tokyo, Japan Main Audience: Researcher Invited?: Yes, Keynote?: No, Competitive?: No
- 6. (2013). Artificial Intelligence for StarCraft. The 18th Game Programming Workshop 2013 (GPW-13), Hakone, Japan
 Main Audience: Researcher
 Invited?: Yes, Keynote?: No, Competitive?: No

Broadcast Interviews

2014/01/14 -Starcraft AI from Build Orders to Unit Micro-Management, AiGameDev.com Interview,2014/01/14Online, Alex Champanardhttp://aigamedev.com/premium/interview/uabot-search-rts/

Text Interviews

2016/04/22	Computers That Crush Humans at Games Might Have Met Their Match: 'StarCraft', Jonathan Cheng, Wall Street Journal http://www.wsj.com/articles/computers-that-crush-humans-at-games-might-have-met-their- match-starcraf
2015/12/09	Why 'True' AI In Video Games Is a Marketing Gimmick, Jordan Pearson, MOTHERBOARD http://motherboard.vice.com/read/why-true-ai-in-video-games-is-a-marketing-gimmick
2012/01/14	Building a better opponent, Tim O'Brien, The Muse (Newspaper) http://themuse.ca/2012/01/14/building-a-better-opponent/
2011/09/14	Battling AI bots in Starcraft, Lance Mudryk, The Gateway (Newspaper) https://thegatewayonline.ca/archives/2013/index.php/article/view/starcraft

Publications

Journal Articles

- Roshan Achal, Mohammad Rashidi, Jeremiah Croshaw, David Churchill, Marco Taucer, Taleana Huff, Martin Cloutier, Jason Pitters & Robert A. Wolkow. (2018). Lithography for robust and editable atomic-scale silicon devices and memories. Nature Communications. 9 <u>http://dx.doi.org/10.1038/s41467-018-05171-y</u> Co-Author Published, Nature, Refereed?: Yes
- 2. Michal Certicky, David Churchill, Kyung-Joong Kim, Martin Certicky, and Richard Kelly. (2018). StarCraft Al Competitions, Bots and Tournament Manager Software. IEEE Transactions on Games (ToG). Published, IEEE, Refereed?: Yes
- D. Churchill and A. Vardy. (2013). An Orientation Invariant Visual Homing Algorithm. Journal of Intelligent & Robotic Systems. (2013/7): 1-27. Published, Refereed?: Yes

 S. Ontanon, G. Synnaeve, A. Uriarte, F. Richoux, D. Churchill, and M. Preuss. (2013). A Survey of Real-Time Strategy Game AI Research and Competition in StarCraft. IEEE Transactions on Computational Intelligence and AI in Games. 5(4): 293-311.
 <u>http://dx.doi.org/10.1109/TCIAIG.2013.2286295</u> Co-Author Published, Refereed?: Yes

Book Chapters

- D. Churchill and M. Buro. (2017). Hierarchical Porfolio Search in Prismata. Game Al Pro 3. : 361-368. Published, CRC Press, Refereed?: Yes
- D. Churchill, M. Preuss, F. Richoux, G. Synnaeve, A. Uriarte, S. Ontanon, and M. Certicky. (2016). StarCraft Bots and Competitions. Encyclopedia of Computer Graphics and Games. : 1-18. <u>http://dx.doi.org/10.1007/978-3-319-08234-9_18-1</u>
 First Listed Author Published, Springer International Publishing, Refereed?: Yes Number of Contributors: 7 Contribution Percentage: 31-40
- S. Ontanon, G. Synnaeve, A. Uriarte, F. Richoux, D. Churchill, and M. Preuss. (2015). RTS AI Problems and Techniques. Newton Lee. Encyclopedia of Computer Graphics and Games. : 1-12. http://dx.doi.org/10.1007/978-3-319-08234-9_17-1 Co-Author Published, Springer International Publishing, Refereed?: Yes Number of Contributors: 6 Contribution Percentage: 11-20

Thesis/Dissertation

- 1. Heuristic Search Techniques for Real-Time Strategy Games. (2016). University of Alberta. Doctorate. Number of Pages: 123 Supervisor: Michael Buro
- 2. Homing in Scale Space. (2009). Memorial University of Newfoundland. Master's Thesis. Number of Pages: 67 Supervisor: Andrew Vardy
- Algorithms for the Construction of Generalized Skolem-Type Sequences. (2005). Memorial University of Newfoundland. Bachelor's Honours.
 Number of Pages: 20 Supervisor: Manrique Mata-Montero, Nabil Shalaby

Magazine Entries

1. M. Buro and D. Churchill. (2012). Real-Time Strategy Game Competitions. AI Magazine. 33(3): 106-108. Published,

Reports

- 1. Churchill, D. (2015). A History of Starcraft AI Competitions. 20. University of Alberta
- 2. Churchill, D. (2015). 2015 AIIDE Starcraft AI Competition Report. 10. University of Alberta
- 3. Churchill, D. (2014). The Prismata AI: How I learned to stop worrying and love the bots. 6. Lunarch Studios.

4. Churchill, D. (2013). 2013 AIIDE Starcraft AI Competition Report. 10. University of Alberta

Online Resources

- 1. Google Scholar Profile. Description / Contribution Value: H-Index = 15 (12 since 2019), i-10 Index = 17 (14 since 2019)
- GitHub Profile.
 Description / Contribution Value: Online repository of research-related code. 1400+ total stars, 400+ total forks.

Conference Publications

- A. Nash, A. Vardy, and D. Churchill. (2023). Herd's Eye View: Improving Game AI Agent Learning with Collaborative Perception. AIIDE-23 AAAI Artificial Intelligence and Interactive Digital Entertainment, , Conference Date: 2023/10 Paper Co-Author Published Refereed?: Yes, Invited?: Yes
- 2. S. Sabraw, and D. Churchill. (2022). Generating 2D Platforming Auto-Play Levels with Genetic Algorithms. NECEC-22 Newfoundland Electrical and Computer Engineering Conference, , Conference Date: 2022/11 Paper Published Refereed?: Yes, Invited?: No
- R. Bishop, and D. Churchill. (2022). The Effects of Human-like Modifications to Heuristic Action Evaluation in Video Game Pathfinding. FDG-2022 Foundations of Digital Games, , Conference Date: 2022/9 Paper Co-Author Published Refereed?: Yes, Invited?: Yes
- L. Critch, and D. Churchill. (2021). Sneak-Attacks in StarCraft using Influence Maps with Heuristic Search. IEEE Conference on Games, , Conference Date: 2021/8 Paper Published Refereed?: Yes, Invited?: Yes
- 5. R. Kelly, and D. Churchill. (2020). Transfer Learning Between RTS Combat Scenarios Using Component-Action Deep Reinforcement Learning. AIIDE-20 Workshop on Artificial Intelligence for Strategy Games, , Conference Date: 2020/10 Paper Published Refereed?: Yes, Invited?: Yes
- 6. L. Critch, and D. Churchill. (2020). Combining Influence Maps with Heuristic Search for Executing Sneak-Attacks in RTS Games. IEEE Conference on Games (CoG) 2020, Japan, Conference Date: 2020/8 Paper Published Refereed?: Yes, Invited?: Yes

- 7. C. Strickland, D. Churchill, and A. Vardy. (2019). A Reinforcement Learning Approach to Multi-Robot Planar Construction. International Symposium on Multi-Robot and Multi-Agent Systems (MRS), New Jersey, United States of America, Paper Published Refereed?; Yes. Invited?; Yes
- 8. David Churchill, Michael Buro, and Richard Kelly. (2019). Robust Continuous Build-Order Optimization in StarCraft. Proceedings, 2019 IEEE Conference on Games. IEEE Conference on Games (CoG), London, United Kingdom. IEEE, Conference Date: 2019/8 Paper Published Refereed?: Yes, Invited?: Yes
- 9. D. Churchill, Z. Lin, and G. Synnaeve. (2017). An Analysis of Model-Based Heuristic Search Techniques for StarCraft Combat Scenarios. AIIDE-17 Workshop on Artificial Intelligence for Strategy Games, , Conference Date: 2017/10 Paper Published Refereed?: Yes
- 10. M. Certicky and D. Churchill. (2017). The Current State of StarCraft AI Competitions and Bots. AIIDE-17 Workshop on Artificial Intelligence for Strategy Games, , Conference Date: 2017/10 Paper Published Refereed?: Yes
- 11. Richard Kelly and David Churchill. (2017). Comparison of Monte-Carlo Tree Search Methods in the Imperfect Information Card Game Cribbage. 2017 Newfoundland Electrical and Computer Engineering Conference (NECEC), St. John's, Canada, Conference Date: 2017/10 Paper Published Refereed?: Yes
- 12. D. Churchill and M. Buro. (2015). Hierarchical Portfolio Search: Prismata's Robust AI Architecture for Games with Large Search Spaces. Proceedings, AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Eleventh AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, Santa Cruz, United States of America. AAAI, Conference Date: 2015/11 Paper Published Refereed?: Yes Description / Contribution Value: Award: Best Student Paper and Best Talk, Artificial Intelligence and Interactive Digital Entertainment Conference

- D. Churchill and M. Buro. (2013). Portfolio Greedy Search and Simulation for Large-Scale Combat in Starcraft. Proceedings, 2013 IEEE Conference on Computational Intelligence and Games. IEEE Computational Intelligence & Games, Niagara Falls, ON, Canada (1-8). IEEE, <u>http://dx.doi.org/10.1109/CIG.2013.6633643</u> Conference Date: 2013/8 Paper Published Refereed?: Yes Description / Contribution Value: Award: Best Paper award for the 2013 Computational Intelligence & Games Conference
- 14. D. Churchill, A. Saffidine, and M. Buro. (2012). Fast Heuristic Search for RTS Game Combat Scenarios. Proceedings, AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Eighth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, Palo Alto, CA, United States of America. IEEE, Conference Date: 2012/10 Paper Published Refereed?: Yes
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