Dr. David Churchill

Correspondence language: English
Date of Birth: 5/25
Country of Citizenship: Canada

Contact Information

The primary information is denoted by (*)

Address

Primary Affiliation (*)

Department of Computer Science
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DRAFT

Dr. David Churchill

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

Canadian Common CV commun canadien

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Dr. David <u>Churchill</u>

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 -

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

2015/11	Best Student Paper: 2015 AAAI Conference on AI and Interactive Digital Entertainment (Canadian dollar)
	AAAI
	Prize / Award
	Best Student Paper Award

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

2016/9	Assistant Professor, Computer Science Computer Science, Memorial University of Newfoundland Full-time, Assistant Professor Tenure Status: Tenure Track
2016/8	Facebook AI Research - Consultant Facebook AI Research, Facebook Part-time Consulting on F.A.I.R. Starcraft AI research project
2014/1	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=3]

2017/5 - 2022/5	NSERC Discovery Grant, Grant Project Description: Artificial Intelligence Research at Memorial Unviersity

Funding Sources:

2017/5 - 2022/5	Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant Total Funding - 100,000 (Canadian dollar) (Canadian dollar)

2017/10 - 2018/9 Principal Investigator	Google DeepMind Research Grant, Grant Project Description: Google DeepMind Research Grant for AI research

Funding Sources:

Google DeepMind
Total Funding - 20,000 (Canadian dollar) (Canadian dollar)

2017/8 - 2017/10 Principal Investigator	Facebook AI Research Grant, Grant, Equipment 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)

Completed [n=2]

2012/9 - 2014/8
Principal Applicant

Queen Elizabeth II Scholarship, Scholarship

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
Principal Applicant

NSERC PGS-D, Scholarship

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

Professor, Computer Science, Memorial University of Newfoundland
Course Title: Computational Intelligence
Course Code: COMP4752
Course Topic: Artificial Intelligence
Course Level: Undergraduate
Academic Session: Winter

Teaching Assistant, Computer Science, Memorial University of Newfoundland
Course Title: Vocational Languages
Course Code: COMP 3710
Course Topic: Programming Languages
Course Level: Undergraduate

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

Teaching Assistant, Computing Science, University of Alberta
Course Title: Advanced Game Programming
Course Code: CMPUT 350
Course Topic: Programming, Artificial Intelligence
Course Level: Undergraduate
Number of Students: 40

Teaching Assistant, Computer Science, Memorial University of Newfoundland
Course Title: Programming in the Small
Course Code: CMPUT 3718
Course Topic: Computer Programming
Course Level: Undergraduate

Course Development

2008/9   Co-Course Organizer, Computer Science, Memorial University of Newfoundland
Course Title: CMPUT 3718
Course Level: Undergraduate
Programming in the Small

Student/Postdoctoral Supervision

Master's Thesis [n=3]

2017/9   Richard Kelly (In Progress) , Memorial University
Principal Supervisor   Student Degree Start Date: 2017/9
Student Canadian Residency Status: Canadian Citizen

2017/9   Rory Campbell (In Progress) , Memorial University
Principal Supervisor   Student Degree Start Date: 2017/9
Student Canadian Residency Status: Canadian Citizen

2017/9   Caroline Strickland (In Progress) , Memorial University
Co-Supervisor   Student Degree Start Date: 2017/9
Student Canadian Residency Status: Canadian Citizen

Journal Review Activities

Reviewer,IEEE Transactions on Computational Intelligence and AI in Games

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

2007/9   APICS Programming Competition Team Organizer, Memorial University of Newfoundland

2007/5	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	Research Consultant, United States 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

2016/9	Co-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
2011/9 - 2012/8	Committee Member, Computing Science Graduate Student Advisory, University of Alberta

Presentations

1. (2017). Playing Your Cards Right: The Hierarchical Portfolio Search AI of 'Prismata'. 2017 Game Developer's Conference (GDC), San Francisco, United States
   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
   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
   Main Audience: Knowledge User
   Invited?: Yes, Keynote?: No, Competitive?: No

5. (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 - 2014/01/14	Starcraft AI from Build Orders to Unit Micro-Management, AiGameDev.com Interview, Online, Alex Champanard http://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

1.   D. Churchill and A. Vardy. (2013). An Orientation Invariant Visual Homing Algorithm. Journal of Intelligent & Robotic Systems. (2013/7): 1-27.
Published,
Refereed?: Yes

2.   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.
http://dx.doi.org/10.1109/TCIAIG.2013.2286295
Co-Author
Published,
Refereed?: Yes

Book Chapters

1.   D. Churchill and M. Buro. (2017). Hierarchical Porfolio Search in Prismata. Game AI Pro 3. : 361-368.
Published, CRC Press,
Refereed?: Yes

2. 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. http://dx.doi.org/10.1007/978-3-319-08234-9_18-1
First Listed Author
Published, Springer International Publishing,
Refereed?: Yes
Number of Contributors: 7
Contribution Percentage: 31-40

3. Churchill, D. and Buro, M.(2016). Hierarchical Portfolio Search in Prismata. Game AI Programming 3. : 1-10.
First Listed Author
Accepted, Charles River Media,
Refereed?: Yes

4. 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

Dissertations

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

3. 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

Conference Publications

1. M. Certicky and D. Churchill. Current State of StarCraft AI Competitions and Bots. AIIDE-17 Workshop on Artificial Intelligence for Strategy Games, ,
Conference Date: 2017/10
Paper

2.   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
Refereed?: Yes, Invited?: No

3.   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. AAAI,
Conference Date: 2015/11
Paper
Published
Refereed?: Yes, Invited?: No
Description / Contribution Value: Award: Best Student Paper and Best Talk, Artificial Intelligence and Interactive Digital Entertainment Conference

4.   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,
http://dx.doi.org/10.1109/CIG.2013.6633643
Conference Date: 2013/8
Paper
Published
Refereed?: Yes, Invited?: No
Description / Contribution Value: Award: Best Paper award for the 2013 Computational Intelligence & Games Conference

5.   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. IEEE,
Conference Date: 2012/10
Paper
Published
Refereed?: Yes, Invited?: No

6.   D. Churchill and M. Buro. (2012). Incorporating Search Algorithms into RTS Game Agents. AIIDE Workshop on Artificial Intelligence in Adversarial Real-Time Games. Eighth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment, United States. IEEE,
Conference Date: 2012/10
Paper
Published
Refereed?: Yes, Invited?: No

7.   D. Churchill and M. Buro. (2011). Build Order Optimization in StarCraft. Proceedings, AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Seventh AAAI Conference on Artificial Intelligence and Interactive Digital Entertaint, Palo Alto, CA, United States,
Conference Date: 2011/10
Paper
Published
Refereed?: Yes, Invited?: No

8. D. Churchill and A. Vardy. (2008). Homing in Scale Space. Proceedings, IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems. IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems, Nice, France. IEEE,
    http://dx.doi.org/10.1109/IROS.2008.4651166
    Conference Date: 2008/9
    Paper
    Published
    Refereed?: Yes, Invited?: Yes

9. E. Brown, D. Churchill, and M. Mata-Montero. (2007). Approximate Scheduling of Final Exams at Memorial University. Proceedings of the 2007 Congreso Internacional de Ingenieria de Sistemas. 2007 Congreso Internacional de Ingenieria de Sistemas, Trujillo, Peru,
    Conference Date: 2007/7
    Paper
    Published
    Refereed?: Yes, Invited?: No

10. D. Churchill, S. Padina, and R.P. Bording. (2006). Seismic tomography as a high performance application. International Conference on High Performance Computing & Simulation, ,
    http://dx.doi.org/10.1109/HPCS.2006.40
    Paper
    Published
    Refereed?: Yes, Invited?: No

11. M. Hamilton, D. Churchill, R.P. Bording, and K. Jordan. (2005). Real Time Parallel Scientific Computation and Visualization using the IBM Bluegene/L Supercomputer. Proceedings of the 2005 Newfoundland Electrical and Computer Engineering Conference. Newfoundland Electrical and Computer Engineering Conference, St. John's, Canada,
    Paper
    Published
    Refereed?: Yes

12. D. Churchill, P. Gillard, M. Hamilton, T. Wareham. (2004). Prototyping Parallel Sequence Edit-Distance Algorithms in FPGA Hardware. Proceedings of the 2004 Newfoundland Electrical and Computer Engineering Conference. Newfoundland Electrical and Computer Engineering Conference, St. John's, Canada,
    Paper
    Published
    Refereed?: Yes