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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
Memorial University of Newfoundland
St. John's Newfoundland and Labrador A1B3X5
Canada

Telephone

Work 1-709-864-6140

Email

Personal (*) dave.churchill@gmail.com
Work dchurchill@mun.ca

Website

Personal <http://www.cs.mun.ca/~dchurchill>

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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: All But Degree
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

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

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

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

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.
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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

- (2015). Game Programming & Technology Panel. Game Discovery Exhibition, Edmonton, AB, Canada
Main Audience: General Public
Invited?: Yes, Keynote?: No, Competitive?: No
- (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
- (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
- (2013). Artificial Intelligence for StarCraft. Japan National Institute of Informatics, Tokyo, Japan
Main Audience: Researcher
Invited?: Yes, Keynote?: No, Competitive?: No

5. (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,
 2014/01/14 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-starcraft>
- 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, 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
2. 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
3. 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.](#) 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
- [2.](#) 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
- [3.](#) 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
- [4.](#) 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
- [5.](#) 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 Entertainment, Palo Alto, CA, United States,
Conference Date: 2011/10
Paper
Published
Refereed?: Yes, Invited?: No
- [6.](#) 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

7. 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
8. 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
9. 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
10. 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