Dr. James Colin Hales

Professional Experience

Simple Machines **June 2017 - Present**

Health Combined June 2017 - September 2017

- Software consultant for Health Combined, an Australian medical social network.
- Implemented a video transcoding pipeline to support streaming video attachments on wall posts and private messages. Developed in Scala using Amazon SQS and Elastic Transcoder.
- Implemented an event sourcing back-end to support organisation pages on the social network. Developed in Scala using Amazon Kinesis and DynamoDB.

Telstra September 2017 - Present

- Software consultant for the Harold project at Telstra, a customer-service chat bot platform.
- Implementing a web application for designing chat bots, an engine for running chat bots and integrating to external chat services, and an acceptance testing framework for testing chat bots.
- Back-end developed in Scala using Akka and Akka HTTP, and front-end developed in Javascript using React and Redux.

Commonwealth Bank of Australia, Analytics & Information **June 2015 - June 2017**

Customer Decisioning and Insights June 2015 - March 2017

- Software engineer for Customer Decisioning and Insights, an expert system providing real-time, personalised marketing strategies across inbound and outbound channels.
- Designed and developed the lambda architecture data load pipeline supplying Customer Decisioning and Insights with integrated feeds of batch and streaming analytics and information.
- Developed in Scala, using Hadoop MapReduce, Scalding, Kafka, Spark, Cassanda, and Oracle.

DailyIQ March 2017 - June 2017

- Software engineer for DailyIQ, a free business analytics and insights tool offered to business customers.
- Reimplemented the supporting ETL pipeline in Apache Spark, enabling the analytics offering to scale to support small business customers.
- Developed in Scala using Apache Spark.

The University of Western Australia, Computer Science and Software Engineering **2013 - 2014**

Laboratory demonstrator: CITS2232 Databases (2013), wrote assessed lab sheet "Introduction to Djano"; CITS2200 Data Structures and Algorithms (2014), wrote supplementary lab sheet "Unit testing with JUnit".

The University of Western Australia, Information Services **2009 - 2012**

IT support analyst, Student Internet Support Office. Configured Linux-based kiosk machines in the university bookshop for students to search for required textbooks. Wrote a Python script that interfaces with Google Apps for Education to retrieve emails for former students with deactivated accounts.

Education

Doctor of Philosophy, Computer Science — May 2016
The University of Western Australia, Perth, Australia.
Advisors: Prof. Tim French, Dr. Rowan Davies.
Thesis Title: Logics for quantifying over information change.
Abstract: Epistemic modal logic models the knowledge that a set of agents hold about the state of the world. The knowledge of agents may change in response to informative updates, events that communicate additional information about the world to the agents whilst leaving the world itself unchanged. We are interested in developing general techniques for determining how a set of agents with some initial knowledge can arrive at a certain state of knowledge through the execution of informative updates, perhaps subject to additional constraints. This could have applications in the development of communication protocols, or in the verification of secure systems. We extend epistemic modal logics with refinement quantifiers, operators in the logic that have the effect of quantifying over informative updates, allowing us to pose questions about the existence of informative updates that result in particular states of knowledge of the agents. We also consider the addition of refinement quantifiers to other modal logics, where refinements correspond to different kinds of "updates"; in logics for games, refinements may correspond to a player discarding possible moves from consideration, or in logics for topology, refinements may correspond to subspace projections. We investigate computational methods in the resulting refinement quantified modal logics, including methods to synthesise informative updates according to desired properties in refinement quantified epistemic modal logic.

Bachelor of Computer and Mathematical Sciences (First Class Honours) — December 2011
The University of Western Australia, Perth, Australia.
Advisors: A/Prof. Tim French, Dr. Rowan Davies.
Thesis Title: Refinement Quantifiers for Logics of Belief and Knowledge.
GPA: 7.000
WAM: 89.250

Bachelor of Computer and Mathematical Sciences — December 2010
Majors in Computation and Pure Mathematics
The University of Western Australia, Perth, Australia.
Majors: Computation and Pure Mathematics.
GPA: 6.792
WAM: 87.167

24th European Summer School in Logic, Language and Information — August 2012
Uniwersytet Opolski, Opole, Poland.

PhD School on Modal Logics, previous to the 7th Methods for Modalities workshop. — November 2011
Universidad de Málaga, Málaga, Spain.

Logic Summer School — December 2010
Australian National University, Canberra, Australia.

iVEC/WASP OpenCL summer school — January 2010
iVEC and the Western Australian Supercomputer Program, Perth, Australia.

Visiting Scholar Positions

Laboratoire Lorrain de Recherche en Informatique et ses Applications (LORIA) September-October 2014
Computational Epistemic Logic in Lorraine research group (CELLO)
Université de Lorraine, Nancy, France.
Showed computability and complexity results for arbitrary positive announcement logic.

Institut de Recherche en Informatique et Systèmes Aléatoires (IRISA) August 2014
Logic and Applications research group (LogicA)
Université de Rennes 1, Rennes, France.
Showed expressivity results for refinement quantified transitive modal logic.

Scholarships and Prizes

Convocation Postgraduate Research Travel Award, The University of Western Australia 2014

Prescott Postgraduate Scholarship, The University of Western Australia 2012

J.A. Wood Memorial Prize, The University of Western Australia 2011

Faculty of Engineering, Computing and Mathematics Medal, The University of Western Australia 2011

Thales Prize in Computer Science, The University of Western Australia 2011

Hackett Alumni Honours Scholarship, The University of Western Australia 2011

Logic Summer School scholarship, Australian National University 2010

South Pacific Region second placing team, ACM Intercollegiate Programming Contest 2010

Fogarty Foundation Excellence Award, The University of Western Australia 2008

Peer-Reviewed Publications

L. Bozzelli, H. van Ditmarsch, T. French, J. Hales, and S. Pinchinat. Refinement modal logic. *Information and Computation* (2014). http://dx.doi.org/10.1016/j.ic.2014.07.013.

T. French, J. Hales, and E. Tay. A composable language for action models. In *Advances in Modal Logic 10* (2014), College Publications, pp. 197–216. Proceedings of the 10th conference "Advances in Modal Logic".

J. Hales. Arbitrary action model logic and action model synthesis. In *Proceedings of the 2013 28th Annual IEEE/ACM Symposium on Logic in Computer Science* (2013), IEEE, pp. 253–262.

J. Hales, T. French, and R. Davies. Refinement quantified logics of knowledge and belief for multiple agents. In *Advances in Modal Logic 9* (2012), College Publications, pp. 317–338. Proceedings of the 9th conference "Advances in Modal Logic".

J. Hales, T. French, and R. Davies. Refinement quantified logics of knowledge. In *Electronic Notes in Theoretical Computer Science 278* (2011), pp. 85–98. Proc. of the 7th Workshop on Methods for Modalities.

Administrative Experience

ACM International Collegiate Programming Contest, South Pacific Region 2012-2014
Judge for ACM ICPC and 'ANZAC' practice competitions at UWA. Systems administrator for UWA practice competitions (2013-2014) and Western Division of South Pacific Regional competition (2014).

The University of Western Australia, Computer Science Students Club 2009-2013
Webmaster (2009), Secretary (2010), Vice-President (2011-2013). Co-organised annual quiz night (2010).

Technical Skills

Programming languages: Scala, Haskell, Python, Java, Bash.

Big data technologies: Spark, Hadoop MapReduce, Scalding, Kafka, Cassandra.

Operating systems: Linux (Fedora, Ubuntu, and CentOS), FreeBSD, Mac OS X, Windows.