**Tom Radcliffe, Ph.D.**

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## EDUCATION & PROFESSIONAL

*Doctor of Philosophy*: Physics, Queen's University at Kingston, 1991
*Master of Science*: Physics, Queen's University at Kingston, 1987
*Bachelor of Science*: Engineering Physics, Queen's University at Kingston, 1984
*Professional:* PEO member 1995-2018, EGBC member, 2012-2020

## ACADEMIC

*Adjunct Assistant Professor*, Department of Pathology and Molecular Medicine, Queen's University, 2007-2012
*Adjunct Assistant Professor*, School of Computing, Queen's University, 2000-2005
*Adjunct Assistant Professor*, Department of Physics, Queen's University, 1995
*Post-doc*, Physics, Queen's, 1993-1996. SNO calibration & simulation
*Post-doc*, Medical Physics, Manitoba, 1992. Mega-voltage imaging, screen physics.
*Post-doc*, Physics, Caltech, 1991. Reactor neutrino detector design & simulation.

## AWARDS

*2016 Breakthrough Prize for Fundamental Physics*: I was one of 1380 physicists honoured with this award, in my case  for work on the Sudbury Neutrino Observatory.

## CAREER HIGHLIGHTS

### August 1997-present: Freelance Scientific and Software Consultant
Embedded development, software design and implementation, data science, modeling and simulation, machine learning, application development. Current clients include embedded and desktop applications for instrument management and calibration, and data analysis. A lot of my work is aimed at bridging the gap between "works in the lab" and "viable commercial product", as I speak the languages of, and have experience in, pure science (particularly physics and biology), engineering, and business, all of which operate under quite different constraints.

### August 2015-April 2018: Director of Engineering/VP of Engineering/Strategic Advisor, ActiveState Software Inc.
Reporting to the CEO, led an entirely new development team through successful post-company-sale transition from multiple undocumented legacy build systems to a unified system that covers Perl, Python, Tcl, Go, and Ruby on multiple platforms. I was heavily involved in strategic planning for the company's future, and engaged in deep collaboration with marketing and sales to encourage revenue growth, including blogging and speaking at conferences and events. Innovative lead generation technology I created using data mining of logs from instrumented installers resulted in significant new sales. After successfully setting the company up for future growth I left on good terms to pursue personal and artistic goals.

*March 2003-2013: President and Founder, Predictive Patterns Software Inc*
Scientific and software consulting firm focused on algorithm design and implementation, embedded development, data analysis, and simulation. Handled all aspects of operations, from marketing and sales to implementation and delivery. Projects included development of fast 2D/3D multi-modal image registration algorithms for real-time (intra-operative) cardiac imaging and spinal imaging, genomic data analysis using supervised and unsupervised machine learning algorithms including novel statistical approaches, and design of new surgical procedures for orthpaedic implants.

*August 2009-July 2015: Software Manager/Engineer, PDS, Inc.*
Development of embedded software for automated water testing. All phases of software life-cycle. Embedded Linux (C++), PIC32 (C), algorithm design, UI/UX design, and data analysis (Python). Support. Managed team. Worked closely with hardware/electronics/optics team and university-based biochemistry research group.

*March 2002 - March 2003: Director of Software Development, MMC*
Reporting to the President, managed multi-functional team that produced MMC's award-winning GeneLinker data mining software. Dealt with difficult situations including downsizing and eventual dissolution of the company during dot-com crash.

*April. 1996- April 2002 : Commercial software positions.*
Senior developer/designer at several software companies, including established enterprises (Hummingbird Communications) and startups (iGO Technologies Inc.)

## SELECTED PUBLICATIONS & PATENTS

Xiao Zhang, Jiamin Chen, Tom Radcliffe, Dave P. LeBrun, Victor A. Tron and Harriet Feilotter, An Array-Based Analysis of MicroRNA Expression Comparing Matched Frozen and Formalin-Fixed Paraffin-Embedded Human Tissue Samples, J Mol Diagn. 2008; 10: 513-519

U.S. Patent 6,990,220, Apparatuses and methods for surgical navigation: Ellis, R. and Radcliffe, T., granted January 24, 2006

Q.R. Ahmad et al (SNO Collaboration), Measurement of the rate of $nu(e) + d \rightarrow p + p + e(-)$ interactions produced by (8)B solar neutrinos at the Sudbury Neutrino Observatory. Phys. Rev. Lett. 2001;87(7):071301

T. Radcliffe, S. Shalev and R. Rajapakshe, Pseudo-Correlation: a Fast, Robust, Absolute, Gray Level Image Alignment Algorithm, Medical Physics 21 (1994) 761

M. Chen, T. J. Radcliffe, D. A. Imel, H. Henrikson and F. Boehm, New Limits on the 17 keV Neutrino, Phys. Rev. Lett. 69 (1992) 3151

**Fiction, Poetry, Screenplays, Performances**

*Books:* Sir Gawain and the Green Knight and Ham, Siduri Press, 2019; The Inner Islands Trilogy: Cedar Island Dreams (illustrated by Hilary Farmer), Siduri Press, 2020; A Knock at the Door (illustrated by Hilary Farmer), Siduri Press, 2020; Where the Humans Went (illustrated by Hilary Farmer), Siduri Press, 2021

*Plays:* All and Nothing (2020); The Christmas Project (2020). Experimental plays written for Zoom and produced by the Gabriola Players Theatre Society.

*Vancouver B-Movie Factory Short Films, 2013-2017:* Man With a Cape; Milk... Gone Bad!; Maplewood Magic; Animal, Vegetable...; Plenty of Frogs; The Flower of Battle; Harrison Harry; Black Hills; A Place Apart; Circus World; Waiting Room

*Vancouver B-Movie Factory Full-Length Features:* Shadow Rule the Light (contributed several scenes); The Other Odyssey (Head Writer)

*Vancouver B-Movie Factory Web Series:* The Odyssey (Head Writer)

*Independent Film:* AlphaMem (full length screenplay, currently in development)

*Selected Short Stories and Poetry:* "Casandra" in "Machine of Death", 2010, D. Malki!, R. North, M. Bernardo eds. (trans. into German, Japanese, Spanish, etc);

"The Revenge of Hillier's Belle", appeared in Mythic Delerium Fall 2016;

"Jane Blonde", appeared in "16 One Sentence Stories", M. Bernardo ed., 2014

*Performance:* Mark Rothko in John Logan's *RED*, directed by Frank Moher, produced by Over The Moon Theatricals, performances July 2021, January 2022.

**OTHER SKILLS**

Expert: C++, Python2/3, C. Intermediate: MATLAB, Fortran, Java, Perl, SQL, various other languages. Experienced with PIC32, PIC18 in C. Expert in image processing, Bayesian statistics, machine learning, simulation (deterministic and Monte Carlo), radiation transport physics, radiation detection, numerical methods, XML, tkinter, wxWidgets and VTK. Windows and Linux experience. I also know which end of a soldering iron to hold.

**OTHER ACTIVITIES AND INTERESTS**

Sailing, kayaking, hiking. Past mentor with FIRST Robotics Team 2809. Acting and directing (stage and film). Voice acting. Improv and musical improv performer.

**REFERENCES**

**Available on request.**