# Kenneth Wingate Regan

*Curriculum vitae*

**Address for Correspondence**
Department of Computer Science and Engineering
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*Dated: 9/2/2015*

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**Current Job Title**: Associate Professor

**Employment** *(Continuous service at UB from 8/1/89)*

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|---|---|
| *Associate Professor*, | Department of Computer Science and Engineering, University at Buffalo. *Current*, from 7/1/98. |
| *Associate Professor*, | Department of Computer Science, University at Buffalo, 8/1/95–6/30/98. |
| *Assistant Professor*, | Department of Computer Science, University at Buffalo, 8/1/89–7/31/95. |
| *Postdoctoral Visitor*, | Cornell Mathematical Sciences Institute, 10/1/86–12/31/87, 9/1/88–7/31/89. |
| *Junior Research Fellow*, | Merton College, Oxford University 10/1/84–9/30/86, 1/1/88–8/31/88. |

**Education**

Oxford University, Doctor of Philosophy (Mathematics), September 1986.
Princeton University, B.A. *summa cum laude* (Mathematics), June 1981.

**Distinctions**

1. *Speaker at TEDxBuffalo 2014*, Canisius Montante Center, October 2104.
2. *Member of international commission* of the World Chess Federation (FIDE) and the Association of Chess Professionals, to combat cheating with computers at chess, June 2013.
3. *Honorary Member of the Golden Key National Honor Society*, elected by the University at Buffalo chapter 10/20/97, cited for Excellence in Teaching.
4. Elected a *Junior Fellow* of Merton College, Oxford, 11/83.
5. *Marshall Scholar*, for study in Mathematics at Oxford, 10/81–9/84.
6. Awarded permanent title of *International Chess Master* by the World Chess Federation (F.I.D.E.), 8/81.
7. *G.B. Cook Senior Prize in Mathematics* (shared), Princeton University, 6/81.

**Primary Research Field** Theoretical Computer Science.

**Publications—last five years**

(1) R. Lipton and K. Regan, "A Finite-Compactness Notion and Property Testing," *Logic in Computational Complexity*, proceedings of a workshop affiliated to LICS 2011, University of Toronto Fields Institute, June 25, 2011 (invited, not refereed).

(2) K. Regan and G. Haworth, "Intrinsic Chess Ratings," Proceedings of AAAI 2011, San Francisco, Aug. 7–11, 2011.

(3) R. Lipton, K. Regan, and A. Rudra, "Symmetric Functions Capture General Functions," in the proceedi ngs of the 36th International Symposium on Mathematical Foundations of Computer Science, Warsaw, Poland, Aug. 22–26, 2011. Springer LNCS **6907**, 2011, pp 436–447.

(4) K. Regan and B. Macieja and G. Haworth, "Understanding Distributions of Chess Performances," 13th ICGA *Advances in Computer Games* conference, Tilburg, Netherlands, November 2011. Final proceedings version published in *Advances in Computer Games*, Lecture Notes in Computer Science **7168**, Springer-Verlag, 2012, pp 230–243.

(5) S. Kalyanasundaram, R. Lipton, K. Regan, and F. Shokrieh, "Improved Simulation of Nondeterministic Turing Machines," *Theoretical Computer Science* **417**, Feb. 2012, 66–73 (special issue for the MFCS 2010 conference).

(6) K. Regan and R. Surówka, "Languages in $AC^1$ Defined by Finite Transducers," in the proceedings of the University of Krakow 'PhD Student Informatics Conference," Krakow, Poland, August 2013.

(7) K. Regan and T. Biswas, "Psychometric Modeling of Decision Making Via Game Play," in the proceedings of the 2013 IEEE Conference on Computational Intelligence in Games, Niagara Falls, Canada, August 2013.

(8) K. Regan and T. Biswas and J. Zhou, "Human and Computer Preferences at Chess," in the proceedings of the 8th Multidisciplinary Workshop on Advances in Preference Handling (MPREFS 2014), associated to AAAI 2014, Quebec City, July 2014.

(9a) T. Biswas and K. Regan, "Efficient Memoization For Approximate Function Evaluation Over Sequence Arg uments," in the proceedings of the 2014 Conference on Algorithmic Aspects of Information Management, Vancouver, Canada, July 2014.

(9b) T. Biswas and K. Regan, "Approximation of Function Evaluation Over Sequence Arguments via Specialized Data Structures," *Theoretical Computer Science*, special issue for the AAIM 2014 conference. (In press; published online at http://www.sciencedirect.com/science/article/pii/S0304397515003114).

(10) T. Biswas and K. Regan, "Quantifying Depth and Complexity of Thinking and Knowledge," in the procee dings of the 7th International Conference on Agents and Artificial Intelligence (ICAART 2015), Lisbon, Portugal, Jan. 10–12, 2015.

(11) G. Haworth, T. Biswas, and K. Regan, "A Comparative Review of Skill Assessment: Performance, Predict ion and Profiling," to appear in the proceedings of the 14th ICGA *Advances in Computer Games* conference, Leiden, Netherlands, July 2015. Proceedings to be published in the Springer-Verlag Lecture Notes in Computer Science series.

**Books**

(1) R. Lipton and K. Regan, *Essays from Gödel's Lost Letter, 2010*, Springer-Verlag, 2013.

(2) R. Lipton and K. Regan, *Quantum Algorithms Via Linear Algebra: A Primer*, MIT Press, 2014.

**Web Articles**

I have authored 80 posts singly and innumerable ones jointly (134 since Feb. 2012) with Richard Lipton on the weblog *Gödel's Lost Letter and P=NP* (`rjlipton.wordpress.com`), which he began in February 2009. I have been a full partner since January 2011. Posts average 4–5 LaTeX source pages—each is a self-contained article not just a note or blurb.

**Invited Presentations—last five years**

1. K. Regan, "Tracking Quantum Computations By Polynomial Arithmetic," Oxford OASIS Computer Science Group, Oxford University, June 12, 2015.

2. K. Regan, "Quantum Computers, and How Does Nature Compute?" Computer Science Seminar, Union College, May 21, 2015.

3. K. Regan, "Skill Assessment Versus Prediction in Game Play and Cheating Detection," Union College Minerva Course on GAMES led by Professor Christopher Chabris, Union College, May 20, 2015.

4. K. Regan, "Modeling Quantum Computations By Polynomial Arithmetic," invited session of the 2015 Bellairs Workshop on Infinite-State Systems, Bellairs Institute, Barbados, March 13–20, 2015 (talk on 3/17).

5. K. Regan, "Human and Computer Preference Divergences at Chess," *Southern Economic Association Annual Conference*, Session 16M, "Economics and Chess," Atlanta, Georgia, 11/24/14 (Monday 3pm).

6. K. Regan, "Analyzing Quantum Circuits Via Polynomials," New York Colloquium on Algorithms and Complexity (also called the "CUNY Theory Day"), City University of New York, 11/15/13. Also given at IBM Watson Laboratories, January 23, 2014.

7. K. Regan, "Deep Analysis of Human Decision Making," IBM Watson Laboratories, 11/14/13.

8. K. Regan, "Statistics and Analytics in Chess: Skill Rating and Cheating Detection," World Chess Federation 84th Congress, Tallinn, Estonia, 10/5/13.

9. K. Regan, "Skill Rating and Cheating Detection at Chess," Coding, Complexity, and Sparsity Workshop, University of Michigan, 8/6/13.

10. K. Regan, "Scoping the Mind with Turing's Chess Machine," University of Bergen, Norway (series in honor of the Turing Centennial), 9/11/12.

11. K. Regan, "Converting Utilities Into Probabilities," ARC Colloquium, Georgia Tech, February 7, 2012.

12. "Symmetric Functions Capture General Functions," for the 4th Annual Eastern Great Lakes Theory Workshop (EaGL'11), 9/11/11.

13. "A Finite-Compactness Notion, and Property Testing," *Logic in Computational Complexity*, workshop affiliated to LICS 2011, University of Toronto Fields Institute, June 25, 2011.

14. "Polynomial Translations of Quantum Circuits," *ARC Colloquium*, Georgia Institute of Technology, Atlanta, GA, 11/15/2010.

15. "P, NP, and the Open-Source Model," *Mathematics Department Seminar*, organized by Professor John Ringland (for undergraduates but attended by many faculty), 9/30/10.

**Press Coverage and Articles About**

1. "Data Skeptic" with Kyle Polich, Podcast #55, posted May 22, 2015 (http://dataskeptic.com/epnotes/ep55_detecting-cheating-in-chess.php).

2. *Buffalo Spree Magazine*, November 2014, article by Matthew Biddle, pages 22–23.

3. Buffalo News, 10/15/14, coverage of TEDxBuffalo 2014 in the Business section.

4. "The Gist with Mike Pesca," *Slate* podcast, 9/2/14, `http://www.slate.com/articles/podcasts/gist/2014/09/the_gist_on_the_sinquefield_cup_chess_tournament_and_maria_konnikova_explains.html`

5. National Public Radio Weekend Edition Saturday, interview with Scott Simon, "How to Catch a Chess Cheater," aired 6/21/14, `http://www.npr.org/2014/06/21/324222845/how-to-catch-a-chess-cheater`

6. Howard Goldowsky, "How to Catch a Chess Cheater: Ken Regan Finds Moves Out of Mind," *Chess Life Magazine* (cover story), June 2014.

7. Dylan McClain, "To Detect Cheating in Chess, a Professor Builds a Better Program," *New York Times*, Science Tuesday section page D3, March 20, 2012. Picked up by many other sources.

8. Tyler Cowen, "Are chess players getting better over time?" for his weblog *Marginal Revolution* on 8/2/11, `http://marginalrevolution.com/marginalrevolution/2011/08/are-chess-players-getting-better-over-time.html`

9. Steven Levitt and Stephen Dubner, "Are We Actually Getting Better at Chess?" for their weblog *Freakonomics* on 8/4/11, `http://www.freakonomics.com/2011/08/04/are-we-actually-getting-better-at-chess/`

**Ph.D. Students, Graduated**

(1) Arun Jagota, "The Hopfield-Clique Network, Associative Memories, and Combinatorial Optimization," 9/90–5/93, degree obtained May 1993.

(2) D. Sivakumar, "Probabilistic Techniques in Structural Complexity Theory," 9/93–8/96, degree obtained August 1996.

(3) Maurice J. Jansen, "Lower Bound Frontiers in Arithmetical Circuit Complexity," 9/99–8/06, degree obtained August 2006.

(4) Qi Duan, "Graph Related Algorithms and Protocols in Wireless Security," 9/03–8/08, degree obtained August 2008.

(5) Robert Surówka, "Polynomials over Finite Rings and Complexity Classes," 9/09–5/14 (supervised 3/12–5/14), defended May 2014.

**Current Ph.D. Students**

(1) Tamal Biswas

(2) James Clay

(3) Michael Wehar (won Best Student Paper award at ICALP 2014, Track B).

**Courses Taught—last five years**

(1) "CSE250: Data Structures and Algorithms," Buffalo, 1/14–5/14, 1/13–5/13, 8/11–12/11, 8/10–12/10.

(2) "CSE191: Discrete Mathematics," Buffalo, 8/13–12/13, 1/11–5/11.

(3) "CS681: Formal Languages I," Buffalo, 1/12–5/12.

(4) "CS396: Theory of Computation," Buffalo, 1/15–5/15.

(5) "CSE596: Theory of Computation," 8/12–12/12, 8/14–12/14.

(6) "CSE696: Complexity Theory," 1/15–5/15.

**Professional and University Service—last five years**

(1) *Named to Editorial Board*, the *Journal of Chess Research*, journal newly founded in May 2014.

(2) *Member of Editorial Board*, the *Journal of Universal Computer Science*, published by the Technical University of Graz, Austria, Sept, 2009–present.

(3) Member, FIDE/ACP Anti-Cheating Committee. Hosted meetings in Buffalo April 21–23, 2014. Have written private reports commissioned by officials in 5 countries, plus 3 public reports. Meeting June 15–17, 2015 in Porto Mannu, Sardinia, Italy. *Public Website* `http://www.cse.buffalo.edu/~regan/chess/fidelity/` on scientific testing of allegations of cheating with computer chess Generally this site, and related articles on the *Gödel's Lost Letter* blog, aim to enhance the public understanding of statistics and science.

1. *Graduate Admissions Committee*, CSE, Buffalo, 2009–present.

2. *Distinguished Speakers Committee*, CSE, Buffalo, present.

**Other Activities**

1. *Consulting*, Stadheim and Grear Law Associates, Chicago, IL, relating to patents, 34.5 compensated hours in 2009–2011.