

# James Michael Worthington

Curriculum Vitae

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## Contact Information

**Office:** Mathematics Department  
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## Education

**Doctor of Philosophy**, Mathematics, Cornell University, August 2009.

Advisor: Dexter Kozen.

Dissertation: “Automata, Representations, and Proofs”.

Graduate Minor: Theoretical Computer Science.

**Master of Science**, Mathematics, Cornell University, August 2006.

**Bachelor of Science**, magna cum laude, Mathematics, Binghamton University, May 2001.

## Research Interests

Automata Theory • Bialgebras • Category Theory • Proof Complexity • Kleene Algebra.

## Publications

### Journal Articles

1. Worthington, J. “A Bialgebraic Approach to Automata and Formal Language Theory.” 29 pages. Submitted.
2. Loeffler, J., Meier, J., and Worthington, J. “Graph Products and Cannon Pairs.” *International Journal of Algebra and Computation* 12 (2002):747–754.

### Refereed Conference Proceedings

1. Worthington, J. “A Bialgebraic Approach to Automata and Formal Language Theory.” In *Proc. Logical Foundations of Computer Science*, volume 5407 of LNCS, edited by S. Artemov and A. Nerode, 451–467. Springer-Verlag, 2009.
2. Worthington, J. “Automatic Proof Generation in Kleene Algebra.” In *10th Int. Conf. Relational Methods in Computer Science (RelMiCS10) and 5th Int. Conf Applications of Kleene Algebra (AKA5)*, volume 4988 of LNCS, edited by R. Berghammer, B. Möller, and G. Struth, 382–396. Springer-Verlag, 2008.

## Presentations

### Conferences

1. “Determinizing, Forgetting, and Automata in Monoidal Categories”, ASL North American Annual Meeting, Washington, DC. March 2010.
2. “A Bialgebraic Approach to Automata and Formal Language Theory”, Logical Foundations of Computer Science (LFCS 09), Deerfield Beach, FL. January 2009.
3. “A Bialgebraic Approach to Automata and Formal Language Theory”, Binghamton University Graduate Conference in Algebra and Topology, Binghamton, NY. November 2008.
4. “Automatic Proof Generation in Kleene Algebra”, Relational Methods in Computer Science and Applications of Kleene Algebra (RelMiCS 08), Frauenwörth, Germany. April 2008.
5. “Automatic Proof Generation in Kleene Algebra with Tests”, European Summer Meeting of the ASL, Wrocław, Poland. July 2007.
6. “Automatic Proof Generation in Kleene Algebra with Tests”, Logic in Computer Science (LICS 07), Wrocław, Poland. July 2007.
7. “Graph Products and Cannon Pairs”, Special Session in Geometric Group Theory (AMS/MAA Joint Meetings), New Orleans, LA. January 2001.
8. “Graph Products and Cannon Pairs”, Seaway Section Meeting of the Mathematical Association of America, Fredonia, NY. November 2000.

### Selected Seminar Talks

1. “Monoidal Categories, Bialgebras, and Automata”, Binghamton University Geometry/Topology Seminar. October 2009.
2. “Bialgebras Arising Naturally”, Cornell University Logic Seminar. April 2009.
3. “Determinization and Forgetful Functors”, Cornell University Logic Seminar. January 2009.
4. “Quantum Pushdown Automata”, Cornell University Logic Seminar. March 2008.
5. “Minimal Honest Polynomial-time Degrees and  $P = NP$ ”, Cornell University Logic Seminar. February 2007.
6. “Incomparable Hyperdegrees via Measure-Theoretic Arguments”, Cornell University Logic Seminar. March 2006.

## Professional Memberships

1. American Mathematical Society.
2. Association for Symbolic Logic.
3. Mathematical Association of America.

## Awards and Honors

1. Cornell Graduate Teaching Assistantship: Computer Science. Spring 2008, Fall 2008, Spring 2009.
2. Cornell University Graduate Research Assistantship (Computer Science). Fall 2007, Summer 2008.
3. Cornell Mathematics Department Hutchinson Fellowship. Spring 2007.  
*Awarded by the Mathematics Department to graduate students who have been outstanding in their work as teaching assistants or as students in the graduate program.*
4. Cornell Graduate Teaching Assistantship: Mathematics. Fall 2002 – Spring 2003, Fall 2003 – Fall 2006.
5. Binghamton University Lawrence I. Wilkins Scholarship. 2001.  
*Awarded to a student majoring in math with demonstrated interest in math, based on merit and academic excellence.*

6. Binghamton University Award for Excellence in Mathematical Sciences. 2001.  
*Presented to the outstanding graduating senior majoring in mathematical sciences.*

## Professional Service

1. Referee: International Conference on Concurrency Theory (CONCUR 09).
2. Referee: Foundations of Software Technology and Theoretical Computer Science (FSTTCS 07).

## Employment

1. Cornell University, Ithaca, NY.  
Aug 2009 – Visiting Lecturer of Mathematics.
2. Cornell University, Ithaca, NY.  
Jun 2009 – Aug 2009 Graduate Assistant, Research Experience for Undergraduates.
3. Cornell University, Ithaca, NY.  
Jun 2003 – Aug 2003 Graduate Assistant, Research Experience for Undergraduates.
4. Kantonsschule Büelrain, Winterthur, Switzerland.  
Aug 2001 – Jul 2002 Englisch Assistenz-Lehrer (Assistant English Teacher).
5. SUNY Potsdam, Potsdam, NY.  
Jun 2001 – Aug 2001 Researcher, Research Experience for Undergraduates.
6. Binghamton University, Binghamton, NY.  
Aug 2001 – Dec 2001 Teaching Assistant.
7. Lafayette College, Easton, PA.  
Jun 2000 – Aug 2000 Researcher, Research Experience for Undergraduates.
8. Security Mutual Life Insurance Company of New York, Binghamton, NY.  
Jun 1999 – Aug 1999 Actuarial Intern.

## Teaching

### Courses Taught at Cornell University

1. Calculus II (Math 1120). Fall 2010.
2. Mathematical Explorations (Math 1300). Fall 2009.
3. Programming Practicum in Java (CS 2111). Spring 2009.
4. Introduction to the Theory of Computing (CS 3810). Summer 2007.

### As Teaching Assistant at Cornell University

Calculus II (MATH 1120) • Linear Algebra for Engineers (MATH 2940) • Differential Equations for Engineers (MATH 2930) • History of Mathematics (MATH 4030) • Calculus for the Life and Social Sciences (MATH 1106) • Introduction to the Theory of Computing (CS 3810) • Introduction to Computing Using Java (CS 1110) • Multivariable Calculus for Engineers (MATH 1920).

## Additional Information

### Languages

Natural: English (fluent) • German (proficient).  
Artificial: C • C++ • Java.

## **Training**

1. Cornell Writing in the Majors Seminar. Spring 2004.
2. Cornell Mathematics Department Teaching Assistant Training. Fall 2002.
3. Foreign Language Assistant Training, Zürich, Switzerland. Fall 2001.

## References

- Dexter Kozen    Joseph Newton Pew, Jr. Professor in Engineering.
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- Anil Nerode    Goldwin Smith Professor of Mathematics.
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- Richard Shore    Professor of Mathematics.
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- Maria Terrell    Senior Lecturer of Mathematics and Director of Teaching Assistant Programs.
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