
Ralph L. Wojtowicz

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Citizenship: USA

Education:

- Doctor of Philosophy in Mathematics. University of Illinois at Urbana-Champaign. 2002
- Master of Science in Aeronautical Engineering. University of Illinois. 1992
- Bachelor of Science in Aeronautical Engineering. Rensselaer Polytechnic Institute. 1988
- Bachelor of Science in Mathematics. Rensselaer Polytechnic Institute. 1988

Employment:

- Assistant Professor. Shepherd University. Department of Computer Sciences, Mathematics and Engineering. 2011–present
- President, Senior Scientist. Baker Mountain Research Corporation. Yellow Spring, West Virginia. 2011–present
- Analyst. Metron, Inc. Reston, Virginia. 2004–2011
- Assistant Professor. University of Dallas. Department of Mathematics and Computer Science. 2001–2004
- Visiting Assistant Professor. Rose-Hulman Institute of Technology. Department of Mathematics. 1999–2001

Project Experience:

- Principal Investigator: Quantum Kan Extensions and Applications. Intelligence Advanced Research Projects Activity (\$100K contract). 2011–2012
- Consultant (with faculty from Rensselaer Polytechnic Institute and the University of Illinois at Urbana-Champaign): Great Computational Intelligence. Air Force Office of Scientific Research (\$600K grant). 2011–2013
- Technical Lead: Anomaly Detection Literature Survey for Adversary Detection Applications. Department of Homeland Security. 2010
- Analyst: Wide Aperture Array Passive Sonar Algorithm and System Development. Office of Naval Research. (\$1.6M contract). 2010
- Technical Lead: Exposing and Influencing Hidden Enemy Networks through Activity Detection. Office of Naval Research (\$1.4M contract). 2009–2010
- Principal Investigator. Categorical Logic as a Foundation for Robust Decision Making. Air Force Office of Scientific Research (\$180K grant). 2008–2010
- Principal Investigator. Categorical Logic as a Foundation for Reasoning Under Uncertainty. (\$500K Phase II SBIR contract). 2006–2008
- Principal Investigator. Measures of Effectiveness Sensitivity Calculator. Office of Naval Research (\$100K contract). 2006–2007
- Principal Investigator. Categorical Logic as a Foundation for Reasoning Under Uncertainty. (\$100K Phase I SBIR contract). 2005–2006
- Analyst. Trade-Net Integration into Global Trader. (\$1.9M contract). 2009–2010
- Technical Lead. Dynamic Networks subcontract to SAIC. (\$70K contract). 2008–2009

Select Publications:

- R. Wojtowicz, S. Bringsjord and J. Hummel. Dynamic Semantics of $\tau\mathbb{N}$ -Theories. Submitted to *Springer Lecture Notes in Computer Science*. January 2012
- S. Bringsjord, J. Taylor, B. van Heuveln, K. Arkoudas, M. Clark and R. L. Wojtowicz. Piagetian roboethics via category theory: moving beyond mere formal operations to engineer robots whose decisions are guaranteed to be ethically correct. *Machine Ethics*. M. Anderson and S. L. Anderson Eds. Cambridge University Press. 2011.
- R. L. Wojtowicz. Non-Classical Markov Logic and Network Analysis. IEEE 12th International Conference on Information Fusion. Seattle, WA. July, 2009. http://www.adjoint-functors.net/Wojtowicz_Fusion2009pp.pdf
- R. L. Streit and R. L. Wojtowicz. A General Likelihood Function Decomposition that is Linear in Target State. in IEEE Aerospace Conference Proceedings. 2009.
- R. L. Wojtowicz. On Transformations Between Belief States. In Soft Methods for Handling Variability and Imprecision. D. Dubois, H. Prade, et al. editors. Volume 48 of Advances in Soft Computing. Springer-Verlag. pp. 313–320. 2008. <http://www.adjoint-functors.net/belief.pdf> (draft)
- R. L. Wojtowicz. *Categorical Logic as a Foundation for Reasoning Under Uncertainty and as a Guide to Machine Learning Algorithm Development*. SBIR Phase I Final Report. September, 2005.
- R. L. Wojtowicz. Symbolic Dynamics and Chaos Defined by Right Adjointness. CASYS'03-Sixth International Conference on Computing Anticipatory Systems (Liege, Belgium). D. Dubois, Editor. American Institute of Physics Conference Proceedings. (718):268-281. 2004. <http://www.adjoint-functors.net/aipcasys2.pdf>
- R. L. Wojtowicz. *On Categories of Cohesive, Active Sets and Other Dynamic Systems*. Ph.D. Thesis. Department of Mathematics, University of Illinois at Urbana-Champaign. 2002.
- R. L. Wojtowicz. *A Numerical Method for Computing Values of Maxwell's Collisions Integral on a Discretized Velocity Space*. M.S. Thesis. Department of Aeronautical and Astronautical Engineering, University of Illinois at Urbana-Champaign. 1992.

Select Awards:

- Best Paper Award. International Conference on computing Anticipatory Systems. Liège, Belgium. 2003
- University of Illinois College of Liberal Arts and Sciences Luckman Award for Excellence in Undergraduate Education. Nominated 1996
- University of Illinois Department of Mathematics Graduate Teaching Award. 1996
- National Science Foundation Graduate Fellowship. 1988–1992
- Outstanding Senior Award. Presented annually to the six outstanding students in the United States for exceptional academic achievement and participation in extracurricular activities by Sigma Gamma Tau, the national honor society for aerospace engineering. 1988
- Ricketts Prize. Presented by Rensselaer Polytechnic Institute in recognition of outstanding achievement. 1988

Select Presentations:

- IEEE 12th International Conference on Information Fusion. Seattle, WA. July 2009
- Air Force Institute of Technology Mathematics Colloquium. Dayton, OH December 2009
- Rose-Hulman Institute of Technology Mathematics Colloquium. October 2009
- Sixth International Conference on Computing Anticipatory Systems. Liège, Belgium. 2003
- Central Texas Algebra Conference. Baylor University. 2003
- AMS Special Session on Discrete Dynamics and Difference Equations. Joint Mathematics Meetings. Baltimore, MD. 2003

Directed Research:

- Special Morphisms in the Stochastic Category. Christine Wiesner. University of Dallas. 2003

Software Development Experience:

- Primary programming languages: Java/Android, C, and Mathematica
- Experience with: R, MatLab, Lisp, Haskell, ML, Maple, PostScript, and SQL (Oracle and PostgreSQL)
- Knowledge of XML, RDF, OWL, and related semantic web technologies
- Operating environments: Linux (Ubuntu), Unix (Solaris), MacOSX, and Windows
- Other tools include: Subversion, emacs, vi, Eclipse, and Protégé

Other Professional Experience:

- Proposal Reviewer for Air Force Office of Scientific Research. 2012–present
- Reviewer: CogSci 2012 and 2011 cognitive science conferences
- Extensive proposal writing and marketing experience with diverse clients
- Contract and grant management
- Recruiting at AMS Joint Mathematics Meetings 2009, 2008, 2006
- Technical report writing in \LaTeX