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Education

Cornell University, 1990. M.Sc.in Computer Science. Ph.D. in Mathematics. Dissertation:
Relating Kripke Models and Realizability. Adviser: Prof. Anil Nerode.

Cornell University, 1979. M.Sc. in Mathematics

University of Nebraska-Lincoln, 1977. B.Sc. in Mathematics. Minors: Physics, English

Work Experience

Research Consultant, Pitney-Bowes: 2004-2008

Resident Director, Vassar-Wesleyan Program in Madrid, Aug. 2005-July 2006.

Resident Director, Vassar-Wesleyan-Colgate Program in Spain, Madrid, Aug. 1999-July 2000.

Project Manager, CUCES Career Guidance Expert System, Dept. of Sociology, Cornell University, 1989.

Consultant, Logic Programming and Expert Systems, Mathematical Sciences Institute, Cornell, 1987-90.

Scriptwriter, Interviewer and Announcer, Radio Exterior de España (Spanish Foreign Radio), 1979-1983.

Journalist, *Europa Press* News Agency, Madrid, 1980-1983.

Teaching and Research Appointments

Prof. of Computer Science, Dept. of Mathematics, Wesleyan University, 2013-

Associate Prof. of Computer Science, Dept. of Mathematics, Wesleyan University, 1997-2013

Assistant Prof. of Computer Science, Dept. of Mathematics, Wesleyan University, 1993-1996.

Instructor, Dept. of Mathematics, University of Pennsylvania, 1990-1993.

Postdoctoral Research Associate, Dept. of Computer Science and MSI, Cornell University, Jan.-Sept. 1990.

Visiting appointments

Visiting Professor, University of Pisa, May 24-Jun 5, 2010.

Visiting Researcher, Technical University of Madrid (Summer, 1997, Oct. -Dec. 2000, Summer 2002, Jan.- Aug. 2003, Jan.- Aug. 2004, Summer 2005, Spring 2007)

Visiting Professor of Computer Science, International Masters Programme in Computational Logic, University of Dresden, June, 2003, June, 1999.

Visiting Researcher, University of Pisa, Summer 2000.

Visiting Researcher, Isaac Newton Institute, Cambridge University, August-September 1995.

Visiting Professor of Computer Science, University of Nancy, France, May-June 1994 & 1995.

Fellowships

Sloane Dissertation Fellow, July, 1988 – August, 1989

MSI Graduate Research Fellow, Cornell University, 1987-88, summer 1987, summer 1988

Hutchinson Fellow, Cornell University, spring 1987

Languages

Fluent in Spanish. Conversational French.

Research Interests

Logic Programming, Relational Programming, Categories and Computer Science, Intuitionistic Semantics, Constructive Set Theory, Linear Logic, Security.

Publications

- [1] “Constraint Logic Programming with a Relational Machine”, *Formal Aspects of Computing* (accepted for publication), with Emilio Jesús Gallego and Julio Mariño.
- [2] “Declarative Compilation for Constraint Logic Programming”, proceedings of LOPSTR 2014 (Logic-based program synthesis and transformation), Canterbury, England, 2015, (with Emilio Jesús Gallego, Julio Mariño).
- [3] “Logic Programming in Tabular Allegories”, ICLP 2012, Leibniz International Proceedings in Informatics (LIPIcs), Schloss Dagstuhl–Leibniz-Zentrum für Informatik, Dagstuhl, Germany, 2012, (with Emilio Jesús Gallego)
- [4] “First-order unification using variable-free relational algebra”, *Logic Journal of the IGPL* and, in electronic form as doi:10.1093/jigpal/jzq011 Mar. 2011, Oxford University Press, (with Emilio Jesús Gallego, Julio Mariño, Pablo Nogueira).
- [5] “Completeness and Cut Elimination in the Intuitionistic Theory of Types”, Part 2 *The Journal of Logic and Computation*, 2010 20(2):597-602; (5pp.) Oxford University Press, 2010 (with Olivier Hermant).
- [6] “On The Algebraic Structure of Declarative Programming Languages” *Theoretical Computer Science*, *Theoretical Computer Science*, 410 (2009), pp. 4626–4671 Elsevier, (with Gianluca Amato, and Robert McGrail).
- [7] “Cut elimination in the intuitionistic theory of types with axioms and rewriting cuts, constructively”, in In C. E. Benz Müller, C. E. Brown, J. Siekmann, and R. Statman, editors, *Reasoning in Simple Type Theory*, Studies in Logic and the Foundations of Mathematics. College Publications, 2008, 34 pp., ISBN: 1904987702 (with Olivier Hermant).
- [8] “A constructive semantic approach to cut elimination in type theories with axioms”, in *Proc. CSL '08*, pages 169–183, Springer, 2008 (with Olivier Hermant).

- [9] “Formal treatment of secure protocols”, in Evangelos Kranakis, Evgueni Haroutunian, and Elisa Shahbazian, editors, *Aspects of Network and Information Security*, pages 74–91. IOS Press, 2008 (with Danny Krizanc).
- [10] “Higher Order Logic Programming Languages with Constraints: a Semantics”, in *Typed Lambda Calculus and Applications, TLCA '07*, LNCS 4583, pp. 272-289, Springer Verlag, Berlin, 2007, (with Susana Nieva).
- [11] “Completeness and Cut Elimination in the Intuitionistic Theory of Types”, *The Journal of Logic and Computation*, 15(6), pp. 821-854, Oxford University Press, 2005, (with Mary de Marco).
- [12] “Hiord: A Type-free Higher-Order Logic Programming Language with Predicate Abstraction”, *Proceedings of Ninth Asian Computing Conference (ASIAN'04)*, LNCS, 3321, pages 93-108, Springer-Verlag, December 2004, (with Daniel Cabeza and Manuel Hermenegildo).
- [13] “A New Framework for Declarative Programming”, *Theoretical Computer Science*, vol:300 pp. 91-160, 2003, (with Peter Freyd and Stacy Finkelstein).
- [14] “Indexed Categories and Bottom-Up Semantics of Logic Programs”, *Logic Programming and Automated Reasoning (LPAR 01)*, LNCS, Springer, 2002, (with Gianluca Amato).
- [15] “Encapsulating Data in Logic Programming via Categorical Constraints”, in *Principles of Declarative Programming: Proceedings of ALP 98*, C. Palamidessi, H.Glaser, and K.Meinke, editors, volume 1490, Lecture Notes in Computer Science, Springer Verlag, 1998 (with R. Mc-Grail).
- [16] “Some Notes on a Relational Abstract Machine for Logic Programming”, in *Using Relational Methods in Computer Science*, Ali Jaoua, Peter Kempf, Gunther Schmidt (eds.) Universität Bundeswehr München, 1998 (with Emily Chapman).
- [17] “Some Intuitions Behind Realizability Semantics for Constructive Logic: Tableaux and Läuchli Countermodels”, *Annals of Pure and Applied Logic*, pp. 187-239, vol 81, Elsevier North-Holland, 1996 (with Michael O'Donnell).
- [18] “Intuitive Counterexamples for Constructive Fallacies”, in *Mathematical Foundations of Computer Science 1994 — 19th International Symposium, MFCS '94, Kosice, Slovakia, August 1994 — Proceedings, Lecture Notes in Computer Science*, volume 841, Ibor Priívara, Branislav Rován and Peter Ružička editors, Springer-Verlag, pp. 87–111, (with Michael O'Donnell), 1994.
- [19] “Realizability, Set Theory and Term Extraction”, in *The Curry-Howard Isomorphism: 8-ème volume des cahiers du centre de logique de l'Université Catholique de Louvain*, pages 257–364, 1994.
- [20] “Combinatory Logic Programming: Computing in Relation Calculi” in *Proceedings of the 1994 International Symposium on Logic Programming*, M. Bruynooghe, ed., M.I.T. Press, pp. 269-285, 1994 (with Paul Broome).
- [21] “Logic Programming in Tau-Categories”, in *Computer Science Logic '94*, LNCS 933, Springer,

- pp. 249-263, 1995 (with Peter Freyd and Stacy Finkelstein).
- [22] “Provability in TBLL (the Tensor Bang Fragment of Linear Logic)”, in *Computer Science Logic* (proceedings of CSL ’91, Bern), LNCS 613, Springer-Verlag, pp. 53-67, (with J. Chirimar), 1992. Expanded version appeared as Univ. of Pennsylvania Technical report, 1993.
- [23] “Logic Programming and Propositions-as-Types: A Realizability Interpretation of declarative Programs” in *Proceedings Of The 1992 Workshop On Types For Proofs And Programs*, Båstad, Sweden, Bengt Nordstrom, Kent Petersson and Gordon Plotkin (eds.), Electronic proceedings: citeseer.ist.psu.edu/343747.html June 1992.
- [24] “Constructive Kripke Semantics and Realizability”, in *Logic from Computer Science*, Y. N. Moschovakis, ed., MSRI Publications, vol. 21, Springer, pp. 319-358, 1992.
- [25] “Kripke Semantics for Dependent Type Theory and Realizability Interpretations”, in *Constructivity in Computer Science*, LNCS 613, Springer Verlag, pp. 22-31, 1991.

Publications submitted or in preparation

- [1] “Kripke Semantics for Higher-Order Type Theory Applied to Constraint Logic Programming Languages”, submitted.

Technical Reports:

- [1] “Logic Programming in Constructive Type Theory” Technical Report, Dept. of Computer Science, Cornell University, 1989, revised 1990.
- [2] “Realizability and Kripke Forcing”, Technical Report 90-1163, Dept. of Computer Science, Cornell University, 1990. Included in “Type Theory and Inhabitation”, cited above.
- [3] “Some Kripke Models for ‘One-Universe’ Martin L of Type Theory”, Technical Report 90-1162, Dept. of Computer Science, Cornell University, 1990. Extended version appeared as “Kripke Semantics for Dependent Type Theory and Realizability Interpretations”, cited above.

Short Courses Taught at Other Universities:

2-week course on “Lambda Calculus, Type Theory and Linear Logic”, Latin American Symposium on Mathematical Logic, meeting of the Association for Symbolic Logic, Bah a Blanca, Argentina. August 1992.

5-week course on “Intuitionistic and Categorical Logic”, University of Nancy, France, May-June 1994.

2-week course on “Linear Logic, Uniform Proof Systems, Categories and Logic Programming”, Universidad Nacional del Sur, Bah a Blanca, Argentina. August 1996.

2-week course on “Categorical Methods in Logic Programming”, University of Pisa, June 1997.

4-week course on “Higher Order Logic and Logic Programming”, International Masters Programme in Computational Logic, University of Dresden, June 1999.

1-week course on “Semantic Methods in Higher-Order Logic Programming”, Technical University of Madrid, December 2000.

1 week course on “Cut Elimination in Higher-Order Logic”, International Masters Programme in Computational Logic, University of Dresden, June 2003.

2-week course on “New Semantic Tools for Logic Programming”, Dept. of Computer Science, University of Pisa, May24-Jun5, 2010.

Recent Invited Lectures, Presentations

“Semantics of Higher-Order Logic programming with Constraints”, Invited Talk, March 2015,  cole des Mines, Fontainebleau, France

“Semantics of Higher-Order Logic programming with Constraints”, Invited Talk, March 2015, INRIA, Paris, France

Conferences and Workshops Organized:

“TPR 07 (Types, Proof and Rewriting)”, Program Committee, University of Paris, June 2007.

“MoveLog 05: Mobile Code Safety and Program Verification Using Computational Logic Tools.” Sitges, Spain, Oct. 5, 2005

“Logic Programming: new Perspectives”, Wesleyan University, May 1996.

“Categories and Logic programming” workshop, Isaac Newton Institute, Cambridge University, Sept. 1995.

Ph. D. Students at Wesleyan:

- Robert McGrail, Wesleyan University, topic: *Monads, Control and Side Effects in Logic Programming*, 1998.
- Mary de Marco, Wesleyan University, topic: *The Semantics of Higher Order Hereditarily Harrop Logic Programming.*, 1998.
- Claudio Gutierrez, Wesleyan University, topic: *The Arithmetic and Geometry of Allegories: Normal Forms and Complexity in a Fragment of the Theory of Relations* , 1998 (second advisor, with Daniel Dougherty).
- Ayalur Krishnan, Wesleyan University, topic: *Universal Quantification and Category change in Logic Programming*, 2005.
- Ed Morehouse, Wesleyan University, topic: *An Adjunction Theoretic Foundation for Proof Search in Intuitionistic First-Order Categorical Logic Programming*, 2013.

M. A. Students:

- Emilio Gallego, UPM (Technical University of Madrid), *First Order Unification Using Variable-Free Relational Algebra*, 2007
- Matt Ruhlen, Wesleyan University, *Relational Compilation of Declarative Programs*, 1995.

External dissertations advised or refereed

- Emilio Gallego Arias, “Relational and Allegorical Semantics for Constraint Logic Programming”, Technical University of Madrid, 2012 (external thesis director).
- Olivier Hermant, “Méthodes sémantiques en Dédution Modulo”, École Polytechnique, Paris, 2005, jury member.
- Gianluca Amato, “Indexed Categories and Logic Programming”, University of Pisa, 2000, adviser.
- Pedro López García. “Non-failure Analysis and Granularity Control in Parallel Execution of Logic Programs”. Universidad Politécnica de Madrid, Spain, June 2000, jury member.

Grants

- PROMESAS, Spanish Ministry of Education grant, 2009-2013, with the Universidad Complutense, and Universidad Politécnica, Madrid.
- “Protocol Analysis with Declarative Tools”, Pitney-Bowes, 2004-2007. Co-PI: Danny Krizanc, Wesleyan.
- “Integrating Proof Theoretic Techniques and Semantic Tools”, European Union IA (Integrated Action) grant, with the École Polytechnique, Paris, and the Technical University of Madrid, (UPM), 2004-2007.
- MERIT, Spanish Ministry of Education grant, 2005-2008, with the Universidad Complutense, and Universidad Politécnica, Madrid.
- CUBICO, Spanish Ministry of Education grant, 2002-2004, with the Universidad Complutense, and Universidad Politécnica, Madrid.
- “Categorical Logic Programming”, CNRS grant, University of Pisa, Italy, 1997-2000.
- Semantics of Computation, ONR travel grant for the year of Semantics of Computation, Cambridge, England, August-October, 1995.

- “Categorical and Relational Logic Programming”, ONR, 1995-1997. Co-PIs: Peter Freyd, University of Pennsylvania, Dan Dougherty, Wesleyan.
- “Programming with Relations”, ONR, 1992-1995. Co-PI: Peter Freyd.
- “Higher-order proof systems”, NSF, with André Scedrov and Dale Miller, University of Pennsylvania, 1990-1993.