

# CURRICULUM VITAE

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## HIGHER EDUCATION

1991–1997 (awarded 29.6.98). Ph.D. (part time) at the School of Computer Studies at Leeds University. My thesis was entitled *Logical Representations for Automated Reasoning about Spatial Relationships*. (Abstract and PostScript available on the WWW at <http://www.comp.ac.uk/brandon/thesis.html>).

1987–1989. Masters' Degree by research at the philosophy department of the University of Leeds. My thesis was entitled *Philosophical Problems Arising in Representing Meaning on Computers*.

1983–1986. Joint Honours degree in Physics and Computer Science at the University of Leeds. I was awarded B.Sc. hons. grade 2(ii).

## EMPLOYMENT

September 2003–Ongoing. Lecturer, School of Computing, University of Leeds.

August 2002–August 2003. Senior Research Fellow, School of Computing, University of Leeds.

July–October 2002. Contracted by Ordnance Survey to develop an *Ontology of the Built Environment*.

January 1999–August 2002. Research Fellow at the University of Leeds School of Computing, working on the EPSRC grant GR/M56807, *Managing Vagueness, Uncertainty and Granularity in Spatial Information Systems*. This research involves collaboration with the Keele University GIS group as well as with the Ordnance Survey and the GIS vendor Laser-Scan.

August 1995–December 1998. Research Officer at the University of Leeds School of Computer Studies, working on the EPSRC grant GR/K65041, *Logical Theories and Decision Procedures for Reasoning about Physical Systems*. During a 13 month period of the project I was responsible for supervising the work of an additional Research Fellow on software development.

May 1994–August 1994. Software Consultant on the CEC Basic Research Action MEDLAR 2 (BRA 6471). This work involved a feasibility study of possibilities for exploiting logic-based reasoning techniques in robotics.

December 1993–April 1994. Technical Assistant for the Programme Committee of ECAI-94 (European Conference on Artificial Intelligence).

October 1992–March 1993. Research Assistant on SERC grant GR/H 78995. Worked on software for automating spatial reasoning. The main result of this work (a composition table for 23 spatial relations) was published in (Cohn, Randell, Cui and Bennett 1993).

1992–1993. Teaching Assistant in Leeds University Department of Philosophy. (I gave six structured tutorials per week on Logic, Theoretical Philosophy and Ethics and gained considerable experience of teaching, marking and dealing with students’ problems.)

July 1991–January 1992. Prolog Programmer for ESPRIT project P2474, *Multi-Modal Interfaces for Man-Machine Interaction (MMI<sup>2</sup>)*,

October 1989–November 1990 Worked on development of a PC software package (*Logic Maker*), a flexible tool for designing, investigating and teaching about logical languages.

October 1988–June 1989. Teaching Assistant in Leeds University Dept of Philosophy.

#### PRINCIPAL RESEARCH INTERESTS

My main research interests can be summarised by the headings:

- Spatial representation and reasoning
- Reasoning with vague and uncertain information
- Geographical information systems (GIS)
- Reasoning about actions, change and physical processes
- Ontology of material objects
- Modal and temporal logics
- Logical languages for high-level control of robots or virtual agents
- Automated theorem proving and decision procedures

#### EXPERIENCE AND ACHIEVEMENTS

##### Research Grants.

2005. Awarded EPSRC grant EP/D002834 on *Foundational Ontology for Information Systems* under the ‘First Grant’ scheme. This employs one Research Fellow and has a total value of £120,509. The project will run from 1.3.06 until 30.4.08.

2005. Awarded EPSRC *Case for New Academics* grant to support a PhD studentship, which is also partially funded by Ordnance Survey.

2004. Awarded a research contract by Ordnance Survey for a project to develop an ontological framework for classification of hydrographic features and integration of hydrographic data. The project ran from March to November 2004, this employed an RA and also a visiting researcher (for 1 month). Total value of the funding provided was £19,952.

2002. Made a successful proposal to the Ordnance Survey to fund myself working on a 4 month research project to develop an *Ontology of the Built Environment*. This ran from July to October 2002 and its total value was £19,673. Additionally, the OS covered the expenses 16 international experts whom I invited to a workshop (organised jointly by myself and OS) on *Geo-Ontology* held in Ilkley in September 2002.

1999. Together with Prof. A.G. Cohn (Leeds University) and Prof. M. Worboys and Dr J. Stell (Keele University) I authored a successful proposal for an EPSRC research project (GR/M56807) to study *Vagueness Uncertainty and Granularity in Spatial Information Systems*. The value of this grant was £237,700 at Leeds plus a similar amount at Keele.

1995. I was the principal author of a successful proposal for an EPSRC funded project on *Logical Theories and Decision Procedures for Reasoning about Physical Systems*. The proposal was highly rated by the reviewers and fully funded (£188,000, grant no. GR/K65041 1995-1998, principal investigator A.G. Cohn).

## Teaching.

Courses taught:

- 2007-8. **Programming for Research** (Level 1, class size 57, 2 semesters). This course gives a general introduction to all aspects of programming, especially in relation to its use in computer science research. The first semester covers development of programming languages and paradigms and surveys research areas and the kinds of programming that they involve. The second semester gives an introduction to five different programming languages (C, Lisp, Prolog, Matlab, Java). The course involves weekly lab-based programming exercises as well as lectures.
- 2007-8. **Knowledge Representation and Reasoning** (MSc Module, class size 4, 1 semester). This course covers a wide range of topics in symbolic Artificial Intelligence including: classical logic, spatial and temporal reasoning, automated reasoning and ontology design. Full details of the course material can be seen at <http://www.comp.leeds.ac.uk/krr/>.
- 2005-7. **Introduction to Programming** (Level 1, class size 160, 2 semesters). This course was the main introductory programming course for all computing students (both single and joint honours). The language taught was Java. The material was designed to take students with no prior knowledge of programming up to a level of basic competence, including elementary understanding of object oriented programming techniques.
- 2003-4. **Object-Oriented Programming** (MSc Module, class size 50). The course began with with a basic introduction to programming in Java and quickly progressed to advanced topics in object-oriented programming and software design.
- 2002-7 **Knowledge Representation and Reasoning** (MSc Module, class size 8-23, 1 semester). This course was a slightly more basic version of the MSc course of the same title mentioned above.

Other teaching experience:

- 2003-8. **Tutor** (School of Computing). This involves giving a tutorial class once per week to around 6-8 students and giving academic and pastoral advice.
- 2003-8. **Final Year Project Supervisor**. To date I have supervised 16 final year undergraduate projects (all but one passed).
- 1988-9. **Level 1 Tutor in Philosophy** (Leeds University Philosophy Department). During this period I gave around 200 seminars on the subjects of elementary logic, theoretical philosophy, and ethics (and also marked hundreds of coursework essays and exam scripts).

## Postgraduate Supervision.

- 2007-ongoing. Supervisor of PhD student Christiana Panayiotou. The research is on ontology-based identification and correction conceptual mismatches in the context of dialogues between learners and teachers. Due to complete Spring 2009. (Student taken over from another supervisor).
- 2007-ongoing. Co-supervisor of PhD student Ilaria Corda. Thesis title *An ontology-based approach for enhancing multi-perspective access to cultural heritage digital collections*.
- 2006-7. Co-supervisor of MSc student Ilaria Corda. Thesis entitled *Ontology-Based Representation and Reasoning about the History of Science*. Submitted April 2007. Awarded after minor corrections.
- 2005-ongoing. Principal co-supervisor of PhD student Ander Altuna. Thesis entitled *Ontological Narratives*. Due to complete July 2008.
- 2005-ongoing. Principal co-supervisor of PhD student David Mallenby. Thesis entitled *Handling Vagueness in Ontologies of Geographic Information*. Due to complete September 2008.
- 1999-2003. Principal co-supervisor of PhD student Paolo Torrini. Thesis on *Qualitative Spatial Reasoning with Super-Intuitionistic Logics*, submitted March 2003, awarded after minor corrections.

I have attended University of Leeds courses on PhD supervision and on the role of the internal examiner.

### **Computer Systems and Software.**

I have considerable experience of developing software systems and have used a wide variety of programming languages including: Prolog, LISP, Pascal, C, POP11, Perl and Java. I am proficient with both Unix and Windows operating systems. I am familiar with a wide variety of applications software. I have particularly good knowledge of the LaTeX document formatting system. I have been responsible for the creation and maintenance of a large number of web sites (see e.g. <http://www.comp.leeds.ac.uk/qsr/>).

### **Conference and Workshop Organisation.**

Organiser of a workshop on *Foundational Ontology for Geographic Information*, Ilkley, April 17–18, 2008.

Programme Co-Chair of the international conference on *Formal Ontology in Information Systems* (FOIS-06), Baltimore, November 9–11, 2006.

Programme Chair of *Automated Reasoning Workshop*, Leeds, 31st March–1st April, 2004.

Member of the programme Committee of: KR-02, QR-03, ARW-03, COSIT-03, FOIS-04, KR-04, COSIT-05, IJCAI-05, GeoS-05, KR-06.

Organised an international workshop on *Geo-Ontology* that was funded by the Ordnance Survey, UK's national mapping agency (held in Ilkley, 16-17th September 2002, <http://www.comp.leeds.ac.uk/brandon/geo-ontology/>).

Co-chair of *Symposium on Spatial Vagueness Uncertainty and Granularity*, held in conjunction with FOIS-01 (conference on Formal Ontology in Information Systems), October 2001, Ogunquit, Maine, USA.

Organised a workshop on *Spatial Vagueness, Uncertainty and Granularity* (held in Ilkley on 9–10th July 2001, <http://www.comp.leeds.ac.uk/vug/IlkleyVUGws.html>).

Organised a workshop on Spatial Reasoning at the University of Leeds, School of Computer Studies, 13–14.7.99. (See <http://www.scs.ac.uk/qsr/LSRW99>).

Technical Assistant for the Programme Committee of ECAI-94.

### **Reviewing.**

I have reviewed papers for the following conferences: ILPS (International Logic Symposium), JELIA (Journées Européennes sur la Logique en Intelligence Artificielle), IJCAI (International Joint Conference on Artificial Intelligence), CADE (Conference on Automated Deduction), ECAI (European conference on Artificial Intelligence), KR (Knowledge Representation), FOIS (Formal Ontologies in Information Systems), COSIT (Conference on Spatial Information Theory), GeoS (Geo-Semantics) and the following journals: Journal of Artificial Intelligence, Theoretical Computer Science (B), AI Magazine, Annals of Mathematics and AI, Fundamenta Informaticae, Journal of Artificial Intelligence Research, Constraints, Spatial Cognition and Computation, Journal of Geographical Systems, Data and Knowledge Engineering, Logical Methods in Computer Science, Journal of Logic and Computation.

I am on the editorial boards of the journals AI Communications and Applied Ontology.

I have acted as a project reviewer for the European Commission in the Information Society Technologies area of the Sixth Framework Programme.

### Visiting Fellowships.

During April 2003 I was a visiting researcher at the IFOMIS medical ontology institute of the University of Leipzig under a ‘Honorarvertrag’ contract.

### Prizes.

I was named as a runner up for the prize offered jointly by the Interest Group on Pure and Applied Logic (IGPL) and the European Association for Logic, Language and Information for “best idea of the year” 1994. This was for my work on spatial logics reported in the paper (Bennett 1994b).

My thesis was nominated for the ECCAI prize for best European PhD thesis in AI. I have been told that it was the runner up for this award.

### Miscellaneous:

- Presented an advanced tutorial course on *Logics for Spatial Reasoning* at the Twelfth European Summer School in Logic, Language and Information (ESSLLI-2000).
- Twice shortlisted for an EPSRC Advanced Research Fellowship (1999,2000).
- Editor of the Leeds University Postgraduate Newsletter from October 1992 to May 1994.
- Organised a demonstration of the Turing Test at the Leeds University open day (1988).

## PUBLICATIONS

### Journal Papers (14):

- Bennett, B., Magee, D. R., Cohn, A. G. and Hogg, D. C.: 2008, Enhanced tracking and recognition of moving objects by reasoning about spatio-temporal continuity, *Image and Vision Computing* **26**(1), 67–81.
- Beck, A. R., Fu, G., Cohn, A. G., Bennett, B. and Stell, J. G.: 2008, A framework for utility data integration in the uk, in V. Coors, M. Rumor, E. M. Fendel and S. Zlatanova (eds), *Proceedings of the Urban Data Management Society Symposium 2007*, Taylor and Francis, Stuttgart, Germany.
- Bennett, B.: 2005, Modes of concept definition and varieties of vagueness, *Applied Ontology* **1**(1), 17–26.
- Bennett, B. and Galton, A.: 2004, A unifying semantics for time and events, *Artificial Intelligence* **153**, 13–48.
- Torrini, P., Stell, J. and Bennett, B.: 2002, Mereotopology in 2nd-order and modal extensions of intuitionistic logic, *Journal of Applied Non-Classical Logics* **12**(3–4), 495–525.
- Vakarelov, D., Dimov, G., Düntsch, I. and Bennett, B.: 2002, A proximity approach to some region-based theories of space, *Journal of Applied Non-Classical Logics* **12**, 527–559.
- Bennett, B., Cohn, A., Wolter, F. and Zakharyashev, M.: 2002, Multi-dimensional modal logic as a framework for spatio-temporal reasoning, *Applied Intelligence* **17**(3), 239–251.
- Bennett, B., Dixon, C., Fisher, M., Franconi, E., Horrocks, I., Hustadt, U. and de Rijke, M.: 2002, Combinations of modal logics, *AI Review* **17**(1), 1–20.
- Bennett, B.: 2001b, A categorical axiomatisation of region-based geometry, *Fundamenta Informaticae* **46**(1–2), 145–158.
- Bennett, B.: 2001c, What is a forest? on the vagueness of certain geographic concepts, *Topoi* **20**(2), 189–201.
- Bennett, B.: 1998, Determining consistency of topological relations, *Constraints* **3**(2&3), 213–225.
- Cohn, A. G., Bennett, B., Gooday, J. and Gotts, N.: 1997, RCC: a calculus for region based qualitative spatial reasoning, *GeoInformatica* **1**, 275–316.
- Bennett, B.: 1996, Modal logics for qualitative spatial reasoning, *Bulletin of the Interest Group in Pure and Applied Logic (IGPL)* **4**(1), 23–45.

Cohn, A. G., Gooday, J., Bennett, B. and Gotts, N.: 1995, A logical approach to representing and reasoning about space, *AI Review* **9**, 255–259.

### Conference Papers (23):

- Mallenby, D. and Bennett, B.: 2007, Applying spatial reasoning to topographical data with a grounded ontology, in F. Fonseca, M. A. Rodrigues and S. Levashkin (eds), *GeoSpatial Semantics, proceedings of the second international conference*, number 4853 in *Lecture Notes in Computer Science*, Springer, Mexico City, pp. 210–227.
- Third, A., Bennett, B. and Mallenby, D.: 2007, Architecture for a grounded ontology of geographic information, in F. Fonseca, M. A. Rodrigues and S. Levashkin (eds), *GeoSpatial Semantics, proceedings of the second international conference*, number 4853 in *Lecture Notes in Computer Science*, Springer, Mexico City, pp. 36–50.
- Bennett, B. and Agarwal, P.: 2007, Semantic categories underlying the meaning of ‘place’, *Spatial Information Theory: proceedings of the 8th international conference (COSIT-07)*, Vol. 4736 of *Lecture Notes in Computer Science*, Springer.
- Bennett, B.: 2006, A theory of vague adjectives grounded in relevant observables, in P. Doherty, J. Mylopoulos and C. A. Welty (eds), *Proceedings of the Tenth International Conference on Principles of Knowledge Representation and Reasoning*, AAAI Press, pp. 36–45.
- Bennett, B.: 2004, Relative definability in formal ontologies, in A. Varzi and L. Vieu (eds), *Proceedings of the 3rd International Conference on Formal Ontology in Information Systems (FOIS-04)*, IOS Press.
- Bennett, B., Magee, D. R., Cohn, A. G. and Hogg, D. C.: 2004, Using spatio-temporal continuity constraints to enhance visual tracking of moving objects, in L. Saitta (ed.), *Proceedings of the 16th European Conference on Artificial Intelligence (ECAI-04)*, ECCAI, IOS Press.
- Bennett, B.: 2003a, A logic of branching histories with a shared linear time series, *Foundations and Applications of Spatio-Temporal Reasoning (FASTR)*, AAAI Spring Symposium, Palo Alto. to appear.
- Bennett, B.: 2003b, The role of definitions in construction and analysis of formal ontologies, *Sixth Symposium on Logical Formalizations of Commonsense Reasoning*, AAAI Spring Symposium, Palo Alto. to appear.
- Bennett, B.: 2002, Physical objects, identity and vagueness, in D. Fensel, D. McGuinness and M.-A. Williams (eds), *Principles of Knowledge Representation and Reasoning: Proceedings of the Eighth International Conference (KR2002)*, Morgan Kaufmann, San Francisco, CA.
- Bennett, B.: 2001a, Application of supervaluation semantics to vaguely defined spatial concepts, in D. Montello (ed.), *Proceedings of the fifth international Conference on Spatial Information Theory (COSIT’01)*, LNCS, Springer, Morro Bay.
- Bennett, B. and Galton, A.: 2001, A versatile representation for time and events, *Fifth Symposium on Logical Formalizations of Commonsense Reasoning (Commonsense 2001)*.
- Bennett, B.: 2001c, Space, time, matter and things, in C. Welty and B. Smith (eds), *Proceedings of the 2nd international conference on Formal Ontology in Information Systems (FOIS’01)*, ACM, Ogunquit, pp. 105–116. <ftp://www.comp.leeds.ac.uk/scs/doc/srg/bennett-fois01.ps>.
- Vakarelov, D., Duentsch, I. and Bennett, B.: 2001, A note on proximity spaces and connection based mereology, in C. Welty and B. Smith (eds), *Proc. 2nd International Conference on Formal Ontology in Information Systems (FOIS’01)*, ACM, pp. 139–150.
- Bennett, B., Cohn, A. G., Torrini, P. and Hazarika, S. M.: 2000a, Describing rigid body motions in a qualitative theory of spatial regions, in H. A. Kautz and B. Porter (eds), *Proceedings of AAAI-2000*.
- Bennett, B., Cohn, A. G., Torrini, P. and Hazarika, S. M.: 2000b, A foundation for region-based qualitative geometry, in W. Horn (ed.), *Proceedings of ECAI-2000*.
- Cristani, M., Cohn, A. and Bennett, B.: 2000, Spatial locations via morpho-mereology, *Proceedings of KR’2000*.

- Bennett, B.: 1998b, Modal semantics for knowledge bases dealing with vague concepts, in A. G. Cohn and L. Schubert (eds), *Principles of Knowledge Representation and Reasoning: Proceedings of the 6th International Conference (KR98)*, Morgan Kaufman.
- Bennett, B., Isli, A. and Cohn, A.: 1998, A system handling RCC-8 queries on 2D regions representable in the closure algebra of half-planes, *Proceedings of the 11th International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems (IEA-AIE)*, LNCS, Springer-Verlag.
- Bennett, B., Cohn, A. G. and Isli, A.: 1997, Combining multiple representations in a spatial reasoning system, *Proceedings of the 9th IEEE International Conference on Tools with Artificial Intelligence (TAI-97)*, Newport Beach, CA, pp. 314–322.
- Bennett, B.: 1996a, The application of qualitative spatial reasoning to GIS, in R. Abraham (ed.), *Proc First Int. Conf. on GeoComputation*, Vol. I, Leeds, pp. 44–47.
- Bennett, B.: 1996b, Carving up space: steps towards construction of an absolutely complete theory of spatial regions, in L. P. J.J. Alfres and E. Orłowska (eds), *Proceedings of JELIA'96*, pp. 337–353.
- Bennett, B.: 1994b, Spatial reasoning with propositional logics, in J. Doyle, E. Sandewall and P. Torasso (eds), *Principles of Knowledge Representation and Reasoning: Proceedings of the 4th International Conference (KR94)*, Morgan Kaufmann, San Francisco, CA.
- Cohn, A. G., Gooday, J. M. and Bennett, B.: 1994, A comparison of structures in spatial and temporal logics, in R. Casati, B. Smith and G. White (eds), *Philosophy and the Cognitive Sciences: Proceedings of the 16th International Wittgenstein Symposium*, Hölder-Pichler-Tempsky, Vienna.

#### **Book Chapters (7):**

- Cohn, A., Hogg, D., Bennett, B., Devin, V., Galata, A., Magee, D., Needhap, C. and Santos, P.: 2006, Cognitive vision: integrating symbolic qualitative representations with computer vision, in H. I. Christensen and H.-H. Nagel (eds), *Cognitive Vision Systems: sampling the spectrum of approaches*, Vol. 3948 of LNCS, Springer, chapter 14, pp. 221–246.
- Bennett, B.: 2007, Spatial reasoning, in K. K. Kemp (ed.), *Encyclopedia of Geographic Information Science*, Sage.
- Bennett, B. and Düntsch, I.: 2006, Axioms, algebras and topology, in I. Pratt-Hartmann, M. Aiello and J. van Benthem (eds), *Handbook of Spatial Logics*, Kluwer. in press.
- Cohn, A., Hogg, D., Bennett, B., Devin, V., Galata, A., Magee, D., Needhap, C. and Santos, P.: 2006, Cognitive vision: integrating symbolic qualitative representations with computer vision, in H. I. Christensen and H.-H. Nagel (eds), *Cognitive Vision Systems: sampling the spectrum of approaches*, Vol. 3948 of LNCS, Springer, pp. 221–246.
- Cohn, A. G., Gotts, N. M., Randell, D. A., Cui, Z., Bennett, B. and Gooday, J. M.: 1997, Exploiting temporal continuity in temporal calculi, in R. G. Golledge and M. J. Egenhofer (eds), *Spatial and Temporal Reasoning in Geographical Information Systems*, Elsevier.
- Cohn, A. G., Bennett, B., Gooday, J. and Gotts, N.: 1997, Representing and reasoning with qualitative spatial relations about regions, in O. Stock (ed.), *Temporal and spatial reasoning*, Kluwer.
- Cohn, A. G., Randell, D. A., Cui, Z. and Bennett, B.: 1993, Qualitative spatial reasoning and representation, in N. P. Carreté and M. G. Singh (eds), *Qualitative Reasoning and Decision Technologies*, CIMNE, Barcelona, pp. 513–522.

#### **Workshop Papers (6):**

- Bennett, B. and Cohn, A. G.: 1999a, Consistency of topological relations in the presence of convexity constraints, *Proceedings of the 'Hot Topics in Spatio-Temporal Reasoning' workshop, IJCAI-99*, Stockholm.
- Bennett, B. and Cohn, A. G.: 1999b, Multi-dimensional multi-modal logics as a framework for spatio-temporal reasoning, *Proceedings of the 'Hot Topics in Spatio-Temporal Reasoning' workshop, IJCAI-99*, Stockholm.

- Bennett, B., Isli, A. and Cohn, A. G.: 1997, When does a composition table provide a complete and tractable proof procedure for a relational constraint language?, *Proceedings of the IJCAI-97 workshop on Spatial and Temporal Reasoning*, Nagoya, Japan.
- Bennett, B.: 1995a, Carving up space: existential axioms for logical theories of spatial regions, *Proceedings of IJCAI95 workshop on Spatial and Temporal Reasoning*.
- Bennett, B.: 1995b, Towards a decision procedure for the RCC theory of spatial regions, *Proceedings of AISB95 workshop — Automated Reasoning: bridging the gap between theory and practice*.
- Bennett, B.: 1994a, Some observations and puzzles about composing spatial and temporal relations, in R. Rodríguez (ed.), *Proceedings ECAI-94 Workshop on Spatial and Temporal Reasoning*.

#### Technical Reports (1):

- Bennett, B., Cohn, A., Torrini, P. and Hazarika, S.: 2000c, Region-based qualitative geometry, *Technical Report 2000.07*, University of Leeds, School of Computer Studies, LS2 9JT, UK.

#### Works Edited (1):

- Bennett, B. and Cristani, M. (guest eds): 2003, *Spatial Cognition and Computation: special issue on spatial vagueness, uncertainty and granularity*, Vol. 3, Nos. 2&3, Lawrence Erlbaum Associates.

#### INVITED TALKS

In addition to many presentations of conference and workshop papers (as listed above in my publications) I have given the following invited talks:

- Ontogenesis project workshop, Windermere, UK (2.7.07): *Architecture for a Grounded Geographic Ontology*.
- Institut für Geoinformatic, University of Münster (19.7.05): *Classifying Hydrographic Features in terms of a Lattice of Vague Properties*.
- Institute for Formal Ontology and Medical Information Science (IFOMIS), Leipzig, series of 3 seminars (29.11.02 and 1-2.12.02): *1) Space, time, matter and things: an ontology of the physical world; 2) An architecture for foundational ontology development; 3) Physical objects: continuity, identity and vagueness*.
- University College Dublin, research seminar (27.11.01): *What is a forest? An approach to handling vague concepts in Geographical Information Systems*.
- Meeting of Algorithms, Problems and Empirical Studies group (APES), Ilkley (4.5.99): *Reducing Topological Relations and the Convexity Predicate to Constraints*.
- Ulster University Department of Computer Science (25.11.98): *Representing spatio-temporal relationships in multi-dimensional modal logic*.
- Keele University Department of Computer Science (11.3.98): *Combining Qualitative and Quantitative Spatial Information*.
- Leeds University CTCS (5.3.98): *Modal Semantics for Databases Dealing with Vague Concepts*.
- York University, AI Interest Group (14.11.96): *Completeness and Categoricity in Region-Based Theories of Space*.
- Ulm University Informatik Department (28.6.95): *Expressing Connectedness and Dimension in a '0-adic' Spatial Logic*.
- Hamburg University Dept of Informatik (30.5.94): *Spatial Reasoning with Propositional Logics*.

- Leeds University CTCS (31.5.94): *Spatial Reasoning with Propositional Logics*.
- Medlar 2 project meeting, Toulouse (24.1.94): *Efficient Spatial Reasoning with Intuitionistic Logic*.
- Leeds Philosophy Society, Lake District conference (8.6.89): *Theories of Emotion in Relation to Wittgenstein's Philosophy of Psychology*.
- Manchester University Philosophy Society (18.11.88): *Truth and Relativity*.
- Leeds University Philosophy Society (15.3.88): *The Concept of Life*.

#### REFEREES

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