

THOMAS BITTNER

CURRICULUM VITAE

June 9, 2011

1. CONTACT INFORMATION

Employment

Departments of Philosophy and Geography,
University at Buffalo
Buffalo, NY 14260-4150
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2. EDUCATION

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| 1999 | Ph.D. | Spatial Information Science, Technical University of Vienna, Austria |
| 1989 | Dipl.Ing. (M.S.) | Electrical Engineering, Technical University of Leipzig, Germany |

3. EMPLOYMENT HISTORY

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| 2011–present | Associate Professor, Department of Philosophy, University at Buffalo, State University of New York, Buffalo, NY 14260-4150.
Associate Professor, Department of Geography, University at Buffalo, State University of New York, Buffalo, NY 14261-0055. |
| 2006–present | Research Scientist, National Center of Geographic Information and Analysis (NCGIA). |
| 2005–2011 | Assistant Professor, Department of Philosophy, University at Buffalo, State University of New York, Buffalo, NY 14260-4150.
Assistant Professor, Department of Geography, University at Buffalo, State University of New York, Buffalo, NY 14261-0055.
Research Scientist, New York State Center of Excellence in Bioinformatics & Life Sciences. |
| 2002–2005 | Senior Research Scientist, Institute for Formal Ontology and Medical Information Science (IFOMIS), Saarland University, Germany. (Permanent position) |
| 2000–2002 | Postdoctoral Research Fellow, Department of Computer and Information Science, Northwestern University, Evanston, IL, USA. |
| 1999–2000 | Postdoctoral Research Fellow, Department of Computing and Information Science, Queen's University at Kingston, Ontario and Department of Geo-Informatics, Laval University, Quebec City, Canada. |
| 1998 | Visiting Research Fellow, National Center of Geographic Information and Analysis, NCGIA, University of Maine, Department of Spatial Information |

- Science and Engineering, Orono, Maine, USA.
- 1996–1999 Research Assistant, Department of Geo-Informatics, Technical University of Vienna, Austria.
- 1989–1996 Senior Software Developer and Analyst, Association for Applied Computer Technology, Leipzig, Germany.

4. EDITORSHIP

- 2007–present Associate Editor, *Journal of Earth Science Informatics* (ESI), Springer Verlag.
- 2009–present Editorial Board Member, *The Open Medical Informatics Journal*, Bentham Open.
- 2010–present Editorial Board Member, *Applied Ontology*, IOS Press.
- 2010–present Editorial Advisory Board Member, Universal Ontology of Geographic Space: Semantic Enrichment for Spatial Data, IGI Global.
- 2011–present Guest Editorial Board member, *Semantic Web Journal*, Special Issue on Semantics for Geochange

5. PUBLICATIONS

ISI citations analysis (January 27, 2011):

19 papers listed, 116 citations, average citations per article: 6.11, h-index = 7

Citation analysis using Harzing, A.W., 2010, Publish or Perish, version 3.14004, available at www.harzing.com/pop.htm (January 27, 2011):

64 papers listed, 1034 citations, average citations per article: 16.16, h-index = 18

5.1. Theses

1. Bittner, T., 1999, Rough Location. Ph.D. Thesis, Technical University of Vienna, Supervisor: Andrew U. Frank, xi + 183 pp.
2. Bittner, T., 1989, Design and Implementation of a Dynamic Data Structure for 3D Computational Modeling and Visualization in Electrical Engineering. Diploma (= M.S.) thesis, Technical University of Leipzig, Supervisor: Dieter Herden.

5.2. Articles in Refereed Scientific Journals

Five Year ISI impact factors are listed where available

1. Hoehndorf, R., Batchelor, C., Bittner, T., Dumontier, M., Eilbeck, K., Knight, R., Mungall, C. J., Richardson, J. S., Stombaugh, J., Westhof, E., Zirbel, C. L., and Leontis, N. B. (2011). The RNA ontology (RNAO): An ontology for integrating RNA sequence and structure data. *Applied Ontology*, 6, Vol. 1, 53–89.

2. Bittner, T., to appear, Vagueness and the tradeoff between the classification and delineation of geographic regions, *International Journal of Geographical Information Science (IJGIS)*. **(Impact factor: 2.293)**
3. Bittner, T., 2010. On the integration of regional classification systems for the National Map. *Cartographica: The International Journal for Geographic Information and Geovisualization*, Vol. 45, Nr. 2, 127–139.
4. Feng, C.C. and T. Bittner, 2010, Ontology-based qualitative feature analysis: Bays as a case study. *Transactions in GIS*, Vol. 14, Nr. 4, 547–568.
5. Bittner, T., 2009, Logical properties of foundational mereo-geometrical relations in bio-ontologies. *Applied Ontology*, Vol. 4, 109–138.
6. Bittner, T., M. Donnelly, and B. Smith, 2009, A spatio-temporal ontology for geographic information integration. *International Journal of Geographical Information Science (IJGIS)*, Vol. 23, 765–798. **(Impact factor: 2.293)**
7. Donnelly, M. and T. Bittner, 2008, Summation relations and portions of stuff. *Philosophical Studies*, Vol. 143, 167–185.
8. Bittner, T. and L. J. Goldberg, 2007, The qualitative and time-dependent character of spatial relations in biomedical ontologies. *Bioinformatics*, Vol. 23, Nr. 13, 1674–1682, doi: 10.1093/bioinformatics/btm155. **(Impact factor: 6.481)**
In 2008 this paper was re-reviewed and accepted for presentation in the Highlight Section of the 16th Annual International Conference on Intelligent Systems for Molecular Biology. **(Acceptance rate of 30%** from 189 submissions of papers that had been successfully published in 2007 in the top journals of the bioinformatics discipline.
http://www.iscb.org/cms_addon/conferences/ismb2008/highlights.php#HL23)
9. Bittner, T. and M. Donnelly, 2007, Logical properties of foundational relations in bio-ontologies. *Artificial Intelligence in Medicine*, Vol. 39, 197–216. **(Impact factor: 2.222)**
10. Sorokine, A., T. Bittner, and C. Renscher, 2006, Ontological investigation of ecosystem hierarchies and formal theory for multiscale ecosystem classifications. *Geoinformatica*, Vol. 10, Nr. 3, 313–335. **(Impact factor 1.314)**
11. Rector, A., J. Rogers, and T. Bittner, 2006, Granularity, scale and collectivity: When size does and does not matter. *Journal of Biomedical Informatics*, Vol. 39, Nr. 3, 333–349. **(Impact factor: 2.605)**
12. Schulz, S., A. Kumar, and T. Bittner, 2006, Biomedical ontologies: What part-of is and isn't. *Journal of Biomedical Informatics*, Vol. 39, Nr. 3, 350–361. **(Impact factor: 2.605)**
13. Donnelly, M., T. Bittner, and C. Rosse, 2006, A formal theory for spatial representation and reasoning in biomedical ontologies. *Artificial Intelligence in Medicine*, Vol. 36, Nr. 1, 1–27. **(Impact factor: 2.222)**
14. Bittner, T., M. Donnelly, and B. Smith, 2004, Endurants and perdurants in directly depicting ontologies. *AI Communications*, IOS Press, Vol. 13, Nr. 4, 247–258. **(Impact factor: 0.680)**
15. Bittner, T., 2004, A mereological theory of frames of reference. *International Journal on Artificial Intelligence Tools (IJAIT)*, Vol. 13, Nr. 1, 171–198.
16. Bittner, T. and B. Smith, 2003, Vague reference and approximating judgments. *Spatial Cognition and Computation*, Vol. 3, Nr. 2, 137–156.
17. Bittner, T., 2002. Approximate qualitative temporal reasoning. *Annals of Mathematics and Artificial Intelligence*, Vol. 35, Nr. 1-2, 39–80. **(Impact factor: 0.803)**

18. Bittner, T. and J. G. Stell, 2002, Approximate qualitative spatial reasoning. *Spatial Cognition and Computation*, Vol. 2, Nr. 4, 435–466.
19. Bittner, T. and J. G. Stell, 2002, Vagueness and rough location. *Geoinformatica*, Vol. 6, 99–121. **(Impact factor 1.314)**
20. Bittner, T. and G. Edwards, 2001, Towards an ontology for geomatics. *Geomatica*, Vol. 55, No. 4, 475–490.
21. Bittner, T., 2001, The qualitative structure of built environments. *Fundamenta Informaticae*, Vol. 46, 97–128. **(Impact factor 0.753)**
22. Bittner, T. and A. U. Frank, 1999. On the design of formal theories of geographic space. *Geographical Systems*, Vol. 1, Nr. 3, 237–275.
23. Bittner, T. and J. G. Stell, 1998, A boundary-sensitive approach to qualitative location. *Annals of Mathematics and Artificial Intelligence*. Vol. 24, 93–114. **(Impact factor: 0.803)**

Submitted/In Revision

24. Bittner, T., Vague size predicates
25. Bittner, T., Vague region-based geometry

5.3. Conference Proceedings

5.3.1. Full papers in refereed conferences with acceptance rates of 50% or below

25. Batchelor, C., T. Bittner, K. Eilbeck, C. Mungall, J. Richardson, R. Knight, J. Stombaugh, C. Zirbel, E. Westhof and N. Leontis, 2009, The RNA Ontology (RNAO): An Ontology for integrating RNA sequence and structure data. In B. Smith (ed.): *1st International Conference on Biomedical Ontology (ICBO09)*, Proceedings. *Nature Preceedings*, precedings.nature.com.
26. T. Bittner, L. J. Goldberg, and M. Donnelly, 2008, Ontology and qualitative medical images analysis. In M. Okada and B. Smith (eds.): *1st International Conference on Interdisciplinary Ontology*, InterOntology08, Proceedings, Keio University Press.
27. Bittner, T., 2007, From top-level to domain ontologies: Ecosystem classifications as a case study. In M. Duckham, B. Kuipers, L. Kulik, and S. Winter (eds.): *Spatial Information Theory, 8th International Conference, COSIT 2007*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 4736, 61–77. **(Acceptance rate 27%)**
28. Bittner, T. and M. Donnelly, 2007, A temporal mereology for distinguishing between integral objects and portions of stuff. In R. Holte and A. Howe (eds.): *22nd International AAAI Conference on Artificial Intelligence (AAAI07)*, Proceedings. AAAI-Press, 287–292. **(Acceptance rate 27%. One of 47 out of 253 papers selected for oral and poster presentation.)**
29. Bittner, T. and M. Donnelly, 2006, A theory of granular parthood based on qualitative cardinality and size measures. In B. Bennett and C. Fellbaum, (eds.): *4th International Conference on Formal Ontology in Information Systems (FOIS06)*, Proceedings. IOS Press, 65–76. **(Acceptance rate 38%. One of the top 3 out of 29 accepted papers.)**
30. Bittner, T. and M. Donnelly, 2007, A formal theory of qualitative size and distance relations. In Price, C. (ed.): *21st International Workshop on Qualitative Reasoning*,

QR2007. <http://www.qrg.northwestern.edu/papers/Files/qr-workshops/QR07/proceedingsqr07/AllPapers.pdf>

31. Bittner, T. and M. Donnelly, 2006, A classification of spatio-temporal entities based on their location in space-time. In E. Zimanyi (ed.): *International Workshop on Semantic-Based Geographical Information Systems (SeBGIS06)*, Lecture Notes in Computer Science, Vol. 4278, 1626–1635, Springer Verlag.
32. Bittner, T. and M. Donnelly, 2005, Computational ontologies of parthood, componenthood, and containment. In L. Kaelbling (ed.): *19th International Joint Conference on Artificial Intelligence*, Proceedings. Professional Book Center, 382–387. **(Acceptance rate 18%)**
33. Donnelly, M. and T. Bittner, 2005, Spatial relations between classes of individuals. In D. Mark and A.G. Cohn (eds.): *Spatial Information Theory, 7th International Conference, COSIT 2007*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 3693, 182–199.
34. Bittner, T. and M. Donnelly, 2004, The mereology of stages and persistent entities. In R. Lopez de Mantaras, and L. Saitta, (eds.): *16th European Conference of Artificial Intelligence, ECAI04*, Proceedings. IOS Press, 283–287. **(Acceptance rate 30%. One of the top 10 out of approx. 180 accepted papers.)**
35. Bittner, T., 2004. Axioms for parthood and containment relations in bio-ontologies, In Hahn, U. (ed.): *1st International Workshop on Knowledge Representation in Medicine, KR-Med04*, CEUR Workshop Proceedings, vol. 102, 4–11. **(Invited for journal publication.)**
36. Bittner, T., M. Donnelly, and B. Smith, 2004, Individuals, universals, collections: On the foundational relations of ontology. In A.C. Varzi and L. Vieu (ed.): *3rd International Conference on Formal Ontology in Information Systems (FOIS04)*, Proceedings. IOS Press, 37–48.
37. Bittner, T. and J.G. Stell, 2003, Stratified rough sets and vagueness. In W. Kuhn, M. Worboys, and S. Timpf (eds.): *Spatial Information Theory, 6th International Conference (COSIT03)*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 2825, 286–303.
38. Reitsma, F. and T. Bittner, 2003, Process, hierarchy, and scale. In W. Kuhn, M. Worboys, and S. Timpf (eds.): *Spatial Information Theory, 6th International Conference (COSIT03)*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 2825, 13–30.
39. Bittner, T., 2002, Reasoning about qualitative spatio-temporal relations at multiple levels of granularity. In F. van Harmelen (ed.): *15th European Conference on Artificial Intelligence, ECAI02*, Proceedings. IOS Press, 317–321. **(Acceptance rate 28%)**
40. Bittner, T., 2002, Judgments about spatio-temporal relations. In D. Fensel, F. Giunchiglia, D.L. McGuinness and M.A. Williams (eds.): *8th International Conference on Principles of Knowledge Representation and Reasoning (KR02)*, Proceedings. Morgan Kaufmann Publishers, 521–532. **(Acceptance rate < 35%)**
41. Bittner, T. and B. Smith, 2001, A taxonomy of granular partitions. In D.R. Montello (ed.): *Spatial Information Theory, 5th International Conference (COSIT01)*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 2205, 28–43.
42. Bittner, T., 2000, A qualitative formalization of built environments. In M.T. Ibrahim, J. Kueng and N. Revell (eds.): *11th International Conference on Database and Expert Systems Applications (DEXA 2000)*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 1873, 959–969.

43. Bittner, T. and S. Winter, 1999, On ontology in image analysis. In P. Agouris and A. Stefanidis (eds.): *Integrated Spatial Databases*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 1737, 168–191.
44. Bittner, T., 1997, A qualitative coordinate language of the location of figures within the ground. In S.C. Hirtle and A. U. Frank (eds.): *Spatial Information Theory, 3rd International Conference (COSIT97)*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol.1329, 223–240.

5.3.2. Full papers in refereed conference proceedings with unknown acceptance rates or acceptance rates > 50%

45. Sorokine, A. and T. Bittner, 2004, Understanding taxonomies of ecosystems: a case study. In Fisher, P. (ed.): *Developments in Spatial Data Handling*, Proceedings. Springer Verlag, 559–572.
46. Feng, C.C., T. Bittner, and D.M. Flewelling, 2004, Modeling surface hydrology concepts with endurance and perdurance. In M. J. Egenhofer, C. Freksa, and H. J. Miller (eds.): *3rd International Conference on Geographic Information Science (GIScience 2004)*, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 3234, 67–80.
47. Bittner, T. and B. Smith, 2003, Directly depicting granular ontologies. In A. Nürnberger and M. Detyniecki (eds.): *1st International Workshop on Adaptive Multimedia Retrieval (AMR 2003)*, Proceedings.
48. Bittner, T., 2003, Indeterminacy and rough approximation. In I. Russell and S.M. Haller (eds.): *16th International FLAIRS Conference*, Proceedings. AAAI Press, 450–454.
49. Bittner, T. and B. Smith, 2003, Granular spatio-temporal ontologies. In H.W. Guesgen, D. Mitra, and J. Renz (eds.): *AAAI Symposium: Foundations and Applications of Spatio-Temporal Reasoning (FASTR)*, Proceedings. AAAI Press, 12–17.
50. Bittner, T. and B. Smith, 2001, A unified theory of granularity, vagueness and approximation. In M. Cristani and B. Bennett (eds.), *Workshop on Spatial Vagueness, Uncertainty and Granularity*, Proceedings.
51. Bittner, T. and B. Smith, 2001, Vagueness and granular partitions. In C. Welty and B. Smith (eds.), *2nd International Conference on Formal Ontology in Information Systems, FOIS01*, Proceedings. Sheridan Press, 309–320.
52. Bittner, T. and J.G. Stell, 2000, Rough sets in approximate spatial reasoning. In W. Ziarko and Y. Y. Yao (eds.): *Rough Sets and Current Trends in Computing*, RSCTC 2000, Proceedings. Springer Verlag, Lecture Notes in Computer Science, Vol. 2005, 445–453.
53. Bittner, T., 2000, Rough sets in spatio-temporal data mining. In J. Roddick and K. Hornsby (eds.): *International Workshop on Temporal, Spatial and Spatio-Temporal Data Mining (TSDM00)*, Proceedings. Springer Verlag, Lecture Notes in Artificial Intelligence, Vol. 2007, 89–104.
54. Bittner, T., 2000, Approximate temporal reasoning. In C. Bettini and A. Montanari (eds.): *AAAI Workshop on Spatial and Temporal Granularity*, Time 2000, Proceedings. AAAI Press, 45–52.
55. Bittner, T. and A.U. Frank, 1998, On representing geometries of geographic space. In T.K. Poiker and N. Chrisman (eds.): *8th Int. Symposium on Spatial Data Handling, SDH98*, Proceedings. International Geographic Union, 111–122.
56. Bittner, T. and A.U. Frank, 1997, An Introduction to the application of formal theories to GIS. In F. Dollinger, and J. Strobl (eds.): *Angewandte Geographische*

Informationsverarbeitung (AGITIX), Proceedings. Salzburger Geographische Materialien, Vol. 26, 11–22.

57. Bittner, T., 1996, A qualitative model of geographic space. In M.J., Kraak, and M. Molenaar, (eds.): *7th International Symposium on Spatial Data Handling (SDH96)*, Proceedings. International Geographic Union, Vol. 2, 10.19–10.32.

5.4. Refereed Book Chapters

58. Bittner, T., M. Donnelly, L. J. Goldberg, and F. Neuhaus, 2008, Modeling principles and methodologies—spatial representation and reasoning. In A. Burger, D. Davidson, and R. Baldock (eds.): *Anatomy Ontologies for Bioinformatics: Principles and Practice*. Springer Verlag, 307–326.
59. Bittner, T. and J. G. Stell, 2007, Approximations. In Shashi Shekhar and Hui Xiong (eds.): *Encyclopedia of GIS*, Springer Verlag, 21–25.
60. Bittner, T., Donnelly, M. and Winter, S. 2005. Ontology and semantic interoperability. In D. Proserpi and S. Zlatanova (eds.): *Large-scale 3D data integration: Challenges and Opportunities*, CRCpress (Taylor & Francis), 139–160.
61. Bittner, T. and B. Smith, 2003, A theory of granular partitions. In M. Duckham, M.F. Goodchild and M.F. Worboys (eds.): *Foundations of Geographic Information Science*, Taylor & Francis, 117–151.

6. PRESENTATIONS

6.1. Invited Presentations

- 2010 Vague size and distance predicates in spatial language annotation. Presented at the workshop on Spatial Language Annotation, The Airlie Center, Washington, DC, September 26–29.
Vagueness and the tradeoff between the classification and delineation of geographic regions. Presented at the Dagstuhl Seminar on Locating Biology, International Conference and Research Center for Computer Science, Dagstuhl, Germany, February 21–26.
- 2009 Vague mereo-geometrical spatial relations. Presented at the meeting of the International Neuroinformatics Coordinating Facility (INCF) Program on Ontologies for Neural Structures Representation and Deployment, Pilsen, Czech Republic, September 8.
Cognitive and formal aspects of vague region-based geometry. Presented at the research colloquium of the Interdisciplinary Transregional Collaborative Research Center Spatial Cognition: Reasoning, Action, and Interaction. Bremen University, Germany, May 26.
Vague region-based geometry and the formal ontology of material entities. Presented at the research colloquium of the Institute for Geoinformatics, University of Münster, Germany, May 12.
Ontology of the National Map. Presented at the UCGIS & USGS specialist workshop on the Ontology for the National Map, Washington DC, Feb 3–4.

- Ontologies for biomedical work - The Relation Ontology (RO) and Basic Formal Ontology (BFO). Presented at the annual meeting of the RNA Ontology Consortium, Cambridge, UK, January 5.
- 2008 Qualitative geometries for medical knowledge representation. Presented at the Kolloquium zur Philosophie, Universität Paderborn, Germany, May 23.
- 2007 Spatio-temporal ontologies for the semantic discovery of geo-resources. Presented at the workshop on geospatial knowledge infrastructures, The Welsh eScience Centre, Cardiff University, UK, November 26–27.
- Formal-ontological foundations for the RNA ontology. Presented at the annual meeting of the RNA Ontology Consortium, Madison, Wisconsin, May 29.
- The OBO Foundry: Towards gold standard terminology resources in the biomedical domain. Presented at the annual meeting of the RNA Ontology Consortium, Madison, Wisconsin, May 28.
- The granular and selective character of spatial representations. Presented at the workshop Handlungsschemata als Grundlage visueller und begrifflicher Strukturierung in der Wissensrepräsentation, Paderborn, Germany, April 19–20.
- The qualitative spatial relations in bio-ontologies. Presented at the Dagstuhl Seminar on the Interoperability of Biomedical Ontologies, International Conference and Research Center for Computer Science, Dagstuhl, Germany, March 27–30.
- 2006 A theory of granular parthood based on qualitative cardinality and size measures. Presented at the Buffalo Logic Colloquium, August 16.
- A mereological theory of frames of reference. Presented at the research colloquium of the interdisciplinary Transregional Collaborative Research Center Spatial Cognition: Reasoning, Action, and Interaction. Bremen University, Germany, March 2.
- 2005 Approximate qualitative temporal reasoning, Presented at the Dagstuhl Seminar 05151, Annotating, Extracting and Reasoning about Time and Events, International Conference and Research Center for Computer Science, Dagstuhl, Germany, April 10–15.
- How formal ontology can guide the search for an appropriate description-logic-based computational ontology: parthood and containment - a case study. Research colloquium, Medical Informatics Research Group, Freiburg University, Germany.
- Research colloquium, Normalizing domain ontologies using Basic Formal Ontology (BFO). Presentation to the Medical Informatics Research Group, Freiburg University, Germany.
- 2004 Spatial ontology and semantics. Presented at the research seminar on bridging the gap between GIS and CAD at the Bentley international user conference, Orlando, USA, May 22–26.
- 2002 Spatio-temporal ontologies for geographic information systems. Presented at the workshop on Geo-Ontology, Ilkley, West Yorkshire, UK, September 16–17.

6.2. Conference, Workshop, and Colloquia Presentations

- 2010 Classification and delineation of geographic regions. IGERT Colloquium presentation, Department of Geography, SUNY Buffalo, March 26.
- 2009 Formal ontology as a foundation of theoretical geography. IGERT Colloquium, Department of Geography, SUNY Buffalo, April 3.
- Theoretical geography and ontology. Annual meeting of the American Association of Geographers, Las Vegas, Nevada, USA, March 22 – 27.
- 2008 An Introduction to formal ontology in GIScience. IGERT Orientation workshop, Ellicottville, USA, August 20 – 21.
- Qualitative Biological Ontologies. Highlight Section of the *16th Annual International Conference on Intelligent Systems for Molecular Biology*, ISMB 2008, Toronto, Canada, July 19–23.
- Ontology and qualitative medical image analysis. Colloquium presentation at the Center for Cognitive Science, SUNY at Buffalo, April 2.
- Ontology and qualitative medical images analysis, *1st International Conference on Interdisciplinary Ontology*, InterOntology08, February 26–27, Tokyo, Japan.
- 2007 From top-level to domain ontologies: Ecosystem classifications as a case study. *Spatial Information Theory, 8th International Conference*, COSIT 2007, Melbourne, Australia, September 19–23.
- A formal theory of qualitative size and distance relations. *21st International Workshop on Qualitative Reasoning*, QR2007, Aberystwyth, UK, June 27–29.
- Qualitative analysis of Visually Evoked Potential (VEP)-graphs, Presentation to the Developmental and Behavioral Neurosciences research group at the Department of Neurology/Jacobs Neurological Institute, SUNY at Buffalo, June 15.
- 2006 A theory of granular parthood based on qualitative cardinality and size measures. *4th International Conference on Formal Ontology in Information Systems* (FOIS06), Baltimore, MD, USA, November 9–11.
- The qualitative and time-dependent character of spatial relations in biomedical ontologies, *2nd International Workshop on Knowledge Representation in Medicine* (KR-Med06), Baltimore, MD, USA, November 8.
- A classification of spatio-temporal entities based on their location in space-time. *International Workshop on Semantic-Based Geographical Information Systems* (SeBGIS06), Montpellier, France, October 29–30.
- An Introduction to formal ontology in GIScience. IGERT Orientation workshop, Glen Iris Inn, Letchworth State Park, August 23 – 24.
- Qualitative abstraction and ontological analysis for radiographic images: the case of Thorax imaging. Presentation to radiologists at Roswell Park Cancer Institute, Buffalo, NY, USA, June 16.
- A mereological theory of frames of reference. Annual meeting of the American Association of Geographers, Chicago, Illinois, USA, March 7 – 11.
- 2005 Foundational relations for spatial ontologies. IGERT Colloquium presentation, Department of Geography, SUNY Buffalo, November 18.
- Vagueness and rough approximations. Colloquium presentation, Department of Geography, SUNY Buffalo, October 28.
- The mereology of stages and persistent entities. International workshop on formal relations at Brock University, St Catharines, Ontario, Canada, September

- 3–4.
 Computational ontologies of parthood, componenthood, and containment. *19th International Joint Conference on Artificial Intelligence*, Edinburgh, UK, July 30 – August 5.
- Comments on 'Granularity Scale & Collectivity' by Rector & Rogers. International Conference on Ontology and Biomedical Informatics, Rome, Italy, April 29–May 2.
- 2004 Individuals, universals, collections: On the foundational relations of ontology. *3rd International Conference on Formal Ontology in Information Systems (FOIS04)*, Torino, Italy, November 4–6.
- The mereology of stages and persistent entities. *16th European Conference of Artificial Intelligence, ECAI04*, August 23–27, Valencia, Spain.
- Axioms for parthood and containment relations in bio-ontologies, *1st International Workshop on Knowledge Representation in Medicine (KR-Med04)*, Whistler, BC, Canada, June 1.
- How to compare the FMA and GALEN, International workshop on Biomedical Ontologies, Lake Balaton, Hungary.
- 2003 Granular mereology. International workshop on formal relations at Brock University, St Catharines, Ontario, Canada, September 23.
- Indeterminacy and rough approximation. *16th International FLAIRS Conference*, St. Augustine, Florida, USA, May 12–14.
- 2002 Reasoning about qualitative spatio-temporal relations at multiple levels of granularity. *15th European Conference on Artificial Intelligence, ECAI02*, Lyon, France, July 2002.
- Judgments about spatio-temporal relations. *8th International Conference on Principles of Knowledge Representation and Reasoning (KR02)*, Toulouse, France, April 22–25.
- 2001 Vagueness and granular partitions. *2nd International Conference on Formal Ontology in Information Systems, FOIS01*, Ogunquit, ME, October 17–19.
- A unified theory of granularity, vagueness and approximation. *Workshop on Spatial Vagueness, Uncertainty and Granularity*, Ogunquit, ME, October 15–16.
- A taxonomy of granular partitions. *Spatial Information Theory, 5th International Conference (COSIT01)*, Morro Bay, CA, USA, September 19–23.
- 2000 A qualitative formalization of built environments. *11th International Conference on Database and Expert Systems Applications (DEXA 2000)*, London, UK, September 4–8.
- Rough sets in approximate spatial reasoning. *Rough Sets and Current Trends in Computing, RSCTC 2000*, Banff, Canada, October 16–19.
- Rough sets in spatio-temporal data mining. *International Workshop on Temporal, Spatial and Spatio-Temporal Data Mining (TSDM00)*, Lyon, France, September 12.
- Approximate temporal reasoning. *AAAI Workshop on Spatial and Temporal Granularity*, Time 2000, Austin, TX, July 2000.
- 1999 On ontology in image analysis. International workshop on *Integrated Spatial Databases*, Portland, Maine, June.
- 1998 On representing geometries of geographic space. *8th Int. Symposium on Spatial*

Data Handling, SDH98, Vancouver, Canada, July 11–15.

On the Ontology of Geographic Space. International Workshop of the Chorochronos network of the European Science Foundation. Aalborg, Denmark, June 19 – 20.

Change of Figure Ground Location. Midterm Report Workshop of the Chorochronos network of the European Science Foundation, Athens, Greece, March 9 – 11.

A Model Theory for Figure Ground Location. 6th Symposium on Mathematics and Artificial Intelligence, Fort Lauderdale, Florida, USA, January 6–7.

- 1997 Towards a Model Theory of Figure Ground Location, International Workshop of the European Spacenet research network, International Conference and Research Center for Computer Science, Dagstuhl, Germany, November 27–29.

A qualitative coordinate language of the location of figures within the ground. *Spatial Information Theory, 3rd International Conference (COSIT97)*, Laurel Highlands, Pennsylvania, USA, October 15–18.

On Figure Ground Location. Department of Spatial Information Science and Engineering, University of Maine, Orono, Maine, USA, October.

An Introduction to the application of formal theories to GIS. *Angewandte Geographische Informationsverarbeitung (AGITIX)*, Salzburg, Austria.

- 1996 A qualitative model of geographic space. *7th International Symposium on Spatial Data Handling (SDH96)*, Delft, The Netherlands, August 12–16.

6.3. Guest Lectures

- 2011 Introduction to Geographical information systems. A guest lecture presented at the Department of Media Study at the University at Buffalo (DMS609, Mapping embodied networks). February 1.
- 2010 Introduction to Applied Ontology. A guest lecture presented to the Media Robotics Lab in the Department of Media Study at the University at Buffalo, September 13.
- 2008 Introduction to Biomedical Ontologies. Guest lecture at the Medical/Health Informatics Department (MHI 501), SUNY at Buffalo, November 11.
- 2006 Introduction to Biomedical Ontologies. Guest lecture at the Medical/Health Informatics department (MHI 501), SUNY at Buffalo, November 15.
- 2005 Introduction to Biomedical Ontologies. Guest lecture at the Medical/Health Informatics Department (MHI 501), SUNY at Buffalo, November 9.

7. PROFESSIONAL SERVICE

7.1. Manuscript reviewer for journals and conference proceedings

approximately 15 reviews per year; more than 120 reviews total.

7.1.1. Manuscript reviewer for:

Annals of Mathematics and Artificial Intelligence
 Applied Ontology
 Artificial Intelligence
 Bioinformatics
 Computers, Environment and Urban Systems
 Erkenntnis
 Fundamenta Informaticae
 IEEE Transactions on Systems, Man, and Cybernetics
 International Journal of Applied Logic
 Journal of Biomedical Semantics
 International Journal of Geographical Information Science (IJGIS)
 ISPRS Journal of Photogrammetry & Remote Sensing
 Journal of Artificial Intelligence Research (JAIR)
 Journal of Spatial Cognition and Computation
 Journal of Spatial Information Science
 Journal of Visual Languages and Computing
 Professional Geographer
 Synthese

7.1.2. Scientific and reviewing committee member

- 2011 International workshop on Shapes - Form and Function in Natural and Artificial Systems, Karlsruhe, Germany, Sept. 26 – 27.
 7th International and Interdisciplinary Conference on Modeling and Using Context, Karlsruhe, Germany, Sept. 28 – 30.
 14th AGILE International Conference on Geographic Information Science, Utrecht, The Netherlands, April 18-21.
 4th International Conference on Geospatial Semantics (GeoS2011), Brest, France, 12–13 May, 2011.
 9th International Conference on Spatial Information Theory (COSIT11), Belfast, Maine, September 2011.
- 2010 ECAI workshop on Spatio-Temporal Dynamics, Lisbon, Portugal, August 2010.
 6th International Conference on Geographic Information Science (GIScience2010), Zurich, Switzerland, September 14–17, 2010.
 GIScience2010 Doctoral Colloquium, Zurich, Switzerland, September 2010.
- 2009 Special track on History and Philosophical Foundations of AI at the German Conference on Artificial Intelligence, University of Paderborn, September 15–18, 2009.
 8th International Conference on Spatial Information Theory (COSIT09), Aber

- Wrac'h, France, September 2009.
- Ontology of the National Map. UCGIS & USGS Specialist Workshop on Ontology for the National Map, Washington DC, Feb 3–4, 2009.
- 2008 International conference on Philosophy's Relevance in Information Science, October 3–4, 2008, Heinz Nixdorf Institute, Paderborn, Germany.
- 5th International Conference on Geographic Information Science (GIScience 2008), Park City, Utah, USA, September 23–26, 2008.
- 21st International Congress of the European Federation for Medical Informatics (MIE08), Göteborg, Sweden, May 25–28, 2008.
- Semantic Scientific Knowledge Integration, AAAI Spring Symposium, Stanford, USA, March 26–28, 2008.
- 21th International FLAIRS Conference, Coconut Grove, Florida, May 15–17, 2008.
- 2007 AISB 2007 Symposium: Spatial Reasoning And Communication, Newcastle, UK, April 2–5, 2007.
- 7th International Conference on Spatial Information Theory (COSIT07), Mt Eliza, Melbourne, Australia, September 20–23, 2007.
- 10th AGILE International Conference on Geographic Information Science, Aalborg University 8–11 May 2007.
- 29th International FLAIRS Conference, Key West, Florida, May 7–9, 2007.
- 2006 International Conference on Spatial Cognition, Bremen, Germany, September 24–28, 2006.
- 4th International Conference on Geographic Information Science (GIScience 2006), Muenster, Germany, September 20–23.
- 19th International FLAIRS Conference, Melbourne Beach, Florida, May 11–13, 2006.
- 2005 6th International Conference on Spatial Information Theory (COSIT05), Ellicottville, NY, USA, September 14–18, 2005.
- 18th International FLAIRS Conference, Clearwater Beach, Florida, May 16–18, 2005.
- 2004 17th International FLAIRS Conference, Miami, Florida, May 17–18, 2004. (Section on Spatiotemporal Reasoning)
- 2003 International Workshop on Reference Ontologies vs. Applications Ontologies, Hamburg, Germany, September 2003.
- 10th International Symposium on Temporal Representation and Reasoning and 4th International Conference on Temporal Logic (TIME-ICTL-2003), Cairns, Queensland, Australia, July 8–10, 2003.
- 16th International FLAIRS Conference in St. Augustine, Florida, May 12–14, 2003 (Section on Spatiotemporal Reasoning).
- 2002 15th International FLAIRS Conference, Pensacola, Florida, May 16–18, 2002 (Section on Spatiotemporal Reasoning).
- 2001 5th International Conference on Spatial Information Theory (COSIT01), Morro Bay, California, USA, September 19–23, 2001.
- International Workshop on Spatial and Temporal Granularity, held in conjunction with the 5th International Conference on Spatial Information Theory (COSIT01).

14th International FLAIRS Conference, Wyndham Casa Marina Resort, Key West, Florida, May 21–23, 2001 (Section on Spatiotemporal Reasoning).

- 2000 European Science Foundation (ESF) Conference on the Geographic Domain and Geographic Information Systems - Ontology and Epistemology for Spatial Data Standards, Agelonde, France, September 23–26, 2000.

7.2. Grant Reviewing

- 2005-2006 Reviewing for the Canada Research Chairs Program.
 2006 Reviewing of two research proposals for the Canadian Geomatics for Informed Decisions (GEOID) research network.

7.3. Conference and Technical Session Organization

- 2009 Tutorial organizer, *Spatial Ontology and Qualitative Reasoning in Bio-Medical Ontologies*, 1st International Conference on Biomedical Ontology, Buffalo, NY, USA, July 20, 2009.
 2005 Tutorial organizer, *An Introduction to Formal ontology and how ontologies can facilitate semantic interoperability*, International Conference of Spatial Information Theory (COSIT), Ellicottville, NY, USA, September 14, 2005.
 2000 Session organizer, *Ontology, Vagueness and Indeterminacy*, International Conference on the Geographic Domain and Geographic Information Systems – Ontology and Epistemology for Spatial Data Standards, Agelonde, France, September 23–26, 2000.

7.4. Participation in ontology consortia and working groups

- RNAO RNA ontology (RNAO) consortium
 Presentations: at annual meetings of the RNAO consortium (2007, 2009)
 Participation in working group meetings:
 Buffalo, NY, July 5 – 7, 2006;
 Bowling Green, Ohio, November 30 – December 03, 2006;
 Salt Lake City, Utah, May 7-8 2008;
 Contributions to conference papers, journal articles including:
 Batchelor, C., T. Bittner, K. Eilbeck, C. Mungall, J. Richardson, R. Knight, J. Stombaugh, C. Zirbel, E. Westhof and N. Leontis, 2009, The RNA Ontology (RNAO): An Ontology for integrating RNA sequence and structure data. In B. Smith (ed.): *1st International Conference on Biomedical Ontology (ICBO09)*, Proceedings. *Nature Preceedings*, proceedings.nature.com. (The journal version of this paper is currently under review.)
- RO Relation ontology (RO)

- Multiple conference papers and journal articles that provide formalizations of spatial relations of the Relation Ontology including:
 Bittner, T., 2009, Logical properties of foundational mereo-geometrical relations in bio-ontologies. *Applied Ontology*, Vol. 4, 109–138.
 Bittner, T. and L. J. Goldberg, 2007, The qualitative and time-dependent character of spatial relations in biomedical ontologies. *Bioinformatics*, Vol. 23, Nr. 13, 1674–1682.
- EnvO Environment Ontology (EnvO) working group
 Presentation at the Dagstuhl Seminar on Locating Biology, February 21–26, 2010.
 Multiple journal articles that provide formalizations of regional classification systems that are important for the ontology of environments:
 Bittner, T., to appear, Vagueness and the tradeoff between the classification and delineation of geographic regions, *International Journal of Geographical Information Science (IJGIS)*.
 Bittner, T., M. Donnelly, and B. Smith, 2009, A spatio-temporal ontology for geographic information integration. *International Journal of Geographical Information Science (IJGIS)*, Vol. 23, 765–798.
- National Map Ontology for the National map
 Presented at the UCGIS & USGS specialist workshop on the Ontology for the National Map, Washington DC, Feb 3–4, 2009.
 Journal article on the ontology of regional classification systems and how they can be integrated in the National Map:
 Bittner, T., 2010. On the integration of regional classification systems for the National Map. *Cartographica: The International Journal for Geographic Information and Geovisualization*, Vol. 45, Nr. 2, 127–139.
- PONS Program on Ontologies for Neural Structures (PONS) Representation and Deployment
 Presentation at the meeting of the International Neuroinformatics Coordinating Facility (INCF) Program on Ontologies for Neural Structures Representation and Deployment, Pilsen, Czech Republic, September 8, 2009.
 Participation in several conference call discussions.
- ISO-Space Participation in the ISO-Space working group meeting on the annotation specification for capturing spatiotemporal information in text (Washington, DC, September 26–29, 2010)

8. UNIVERSITY SERVICE

8.1. Department of Philosophy, University at Buffalo

- 2010–2011 Library / Web Page / Nousletter Committee (Chair)
 Progress and Evaluation Committee

2009–2010	Library Committee (Chair) Progress and Evaluation Committee
2009–2010	Library Committee (Chair) Progress and Evaluation Committee
2008–2009	Placement Committee Teaching Quality Evaluation Committee Course Committee, PHI215
2007–2008	Graduate Affairs Committee Cognitive Science Committee (Chair)
2006–2007	Undergraduate Affairs Committee Cognitive Science Committee (Chair)
2005–2006	Admissions and Financial Aid Committee Cognitive Science Committee (Chair)

8.2. Department of Geography, University at Buffalo

2009–2011	Graduate Committee (elected)
2006	Search Committee, GIScience, Department of Geography

9. TEACHING EXPERIENCE

University at Buffalo (Total number of students taught since 2005: 417)

PHI 531: Problems in ontology	Fall 2003 (8 graduate students)
	Fall 2005 (8 graduate students)
	Fall 2006 (14 graduate students)
	Fall 2007 (12 graduate students)
	Fall 2008 (7 graduate students)
PHI 549: Applied ontology	Fall 2009 (9 graduate students)
	Fall 2010 (6 graduate students)
PHI 215: Introduction to deductive logic	Spring 2008 (50 students)
	Spring 2009 (43 students)
	Spring 2010 (64 students)
	Spring 2011 (67 students)
GEO 481/506: Introduction to Geographical Information Systems	Spring 2006 (26 undergraduate, 11 graduate students)
	Spring 2007 (23 undergraduate, 10 graduate students)
	Spring 2008 (24 undergraduate, 5 graduate students)
	Spring 2009 (20 undergraduate, 7 graduate students)

	Spring 2010 (23 undergraduate, 12 graduate students)
GEO 488/556: GIS Design	Fall 2008 (9 undergraduate, 7 graduate students)
	Fall 2009 (6 undergraduate, 11 graduate students)
	Fall 2010 (6 undergraduate, 12 graduate students)
GEO 595: Database design for GIS	Fall 2007 (16 students)
GEO 655: Advanced topics in Geographic Information Systems	Spring 2011 (20 graduate students)

10. INVITED COURSES

Summer 2009	Introduction to Applied Ontology, Institute for Geoinformatics, University of Münster, Germany.
Summer 2008	Formal-Ontologische Prinzipien für Handlungen in der Wissensrepräsentation, Paderborn University, Department of Philosophy. Supported by a grant from the German Science Foundation.
Summer 2004	Ontology and Semantic Interoperability, International Summer School, organized by the Canadian research network of Geomatics for Informed Decisions (GEOID).

11. GRADUATE STUDENTS (THESIS TITLE/TOPIC)

11.1. M.A./M.S. Committee Chair

2009–present	Robert Rovetto, Philosophy, <i>TBD</i>
2009–present	Bo Li, Geography, <i>TBD</i>
2010–present	Boxin Feng, Geography, <i>TBD</i>
2010–present	Lizhao Liu, Geography, <i>TBD</i>
2010–present	Peng Wang, Geography, <i>TBD</i>
2010–present	Xiyao Zhang, Geography, <i>TBD</i>
2010–present	Junwei Zhou, Geography, <i>TBD</i>
2010–present	Evan Iacobucci, Philosophy, <i>TBD</i>
2011–present	Xiaoqi Ma, Geography, <i>TBD</i>

11.2. M.A./M.S. Committee Member

Emmanuelle Ameroso (completed; Geography)
 Benjamin D. Kamphaus (completed; Geography)
 Zhihao Wang (in progress; Geography)

KristL Nowell (in progress; Philosophy)

11.3. Ph.D. Committee Chair

2010–present Ryan Kohl (web services, ontology, and practical aspects of semantic annotations)

2007–2011 Heath E. Robinson, Co-chair with Jessie Poon, Geography, The Ontological Representation of the State for Knowledge Computation Engines.

11.4. Ph.D. Committee Member

Bill Duncan (in progress, Philosophy)

Cara Fraser (in progress, Anthropology)

Jeffery Gower (in progress, Geography)

Christopher Brehme (completed, Geography)

Gaurav Sina (completed, Geography)

Alexandre Sorokine (completed, Geography)