

## Jaime G. Carbonell -- Curriculum Vita

### Business Address

Language Technologies Institute  
Carnegie Mellon University  
Pittsburgh, Pennsylvania 15213 USA  
Telephone: (412) 268-7279  
Email: [jgc@cs.cmu.edu](mailto:jgc@cs.cmu.edu)

Fax: (412) 268-6298  
<http://www.cs.cmu.edu/~jgc/>

**Personal:** Born: July 29, 1953. Citizenship: USA

### Academic and Professional Positions Held

2012 - Present	University Professor, School of Computer Science, Carnegie Mellon University
1996 - Present	Director, Language Technologies Institute, Carnegie Mellon University
1995 - Present	Allen Newell Professor of Computer Science, Carnegie Mellon University
2006 - Present	Adjunct Faculty, Dept of Computational Biology, U Pittsburgh Medical School.
2003 - Present	Chairman, Carnegie Speech Corp.
2001 - 2011	Co-Founder, Board chairman, Carnegie Speech Incorporated
1995 - 2003	Co-Founder, Board chairman, Wisdom Technologies Corporation
1986 - 1996	Director, Center for Machine Translation, Carnegie Mellon University
1987 - 1995	Professor of Computer Science, Carnegie Mellon University
1983 - 1987	Associate Professor of Computer Science, Carnegie Mellon University
1983 - 1996	Co-Founder, Director, Scientific advisor, Carnegie Group Inc.
1979 - 1983	Assistant Professor of Computer Science, Carnegie Mellon University
1975 - 1978	Research Fellow in Computer Science, Yale University
1975 - 1977	Teaching Assistant in Computer Science, Yale University
1974 - 1975	Research Assistant, Center for Space Research, MIT
1971 - 1975	Research Programmer, Artificial Intelligence, BBN, Cambridge, MA

### Education

1975 - 1979 <b>Yale University</b>	PhD 1979 - Computer Science MPhil 1977 - Computer Science MS 1976 - Computer Science
1971 - 1975 <b>Massachusetts Institute of Technology</b>	SB 1975 - Physics SB 1975 - Mathematics

### Professional Organizations and Activities

**Member:** ACM (elected Chair of SIGART 1983-85), ACL, AAAI (AAAI Fellow 1988-present, AAAI executive committee 1990-92), Cognitive Science Society, Sigma Xi, AMTA.

**Government Committees:** NSF/CISE Scientific Advisory Committee (2010-present), NIH Human Genome Scientific Advisory Committee, aka "Watson Committee" (1988-1992). DFKI (National German AI Lab) Scientific Advisory Board (1988-2003). National Institute of Standards and Technology (NIST/IAD), Scientific Advisory Committee (1997-2001), DOE Oakridge National Laboratories Scientific Advisory Committee (1985-1987), GMD/IPSI Information Sciences (Germany) Scientific Advisory board (1990-2001), Citigroup Technology Advisory committee (1987-1995).

**Book Series co-Editor:** *Lecture Notes in Artificial Intelligence* North American editor, Springer (1996-2008).

**Editorial Boards:** Machine Learning Journal (1984-2000, editor-in-chief 1988-1993), Machine Translation Journal (1980's), Artificial Intelligence Journal (1984-2008).

### Other Accomplishments

**Research:** Invented multiple well-known algorithms and methods in statistical machine learning and including: Proactive Machine Learning (with Donmez) for multi-source cost-sensitive active learning, Linked Conditional Random Fields (L-SCRF, with Liu) for predicting tertiary and quaternary protein folds, Maximal Marginal Relevance (MMR, with Goldstein) for information novelty, retrieval and summarization, topic-conditioned

modeling for novelty detection, symmetric optimal phrasal alignment method for trainable example-based and statistical machine translation, series-anomaly modeling for financial fraud detection and syndromic surveillance, knowledge-based interlingual machine translation (and later extended it with colleagues: Tomita, Nirenburg, Nyberg, and Mitamura), transformational analogy for case-based reasoning, derivational analogy for reconstructive justification-based reasoning (with Veloso), robust case-frame parsing (with Hayes), Seeded Version-Space Learning (with polynomial complexity), and developed improvements to several other machine learning algorithms. Current research foci include robust statistical learning and mapping protein sequences to 3D structure and inferring functional properties, automated transfer-rule learning for Machine Translation, , enriched active transfer learning context-based machine translation, and machine translation for very rare languages.

**Software artifacts:** Protein structure prediction software (with Liu), active and proactive learning algorithms (with Donmez), PRODIGY general-purpose planner (with Minton and Veloso), KANT knowledge-based machine translation (with Nyberg and Mitamura), JAVELIN Question-Answering system (with Nyberg et al), CONDOR search engine (with Callan et al), MMR summarizer engine (with Goldstein), POLITICS simulated reasoning engine, DIPLOMAT speech-MT (with Frederking et al), EBMT example-based general purpose MT (with Brown), SMOKEY distributed sensor-based fire detection and suppression system, and several others.

**Education:** Created the PhD program at CMU on Language Technologies with 100 PhD candidates presently enrolled. Created new courses in Language Technologies, Machine learning, Data Mining and eCommerce. Edited 3 books on Machine Learning. Created multiple industrial intensive tutorials. Taught undergraduate and graduate courses in Artificial Intelligence, Machine Learning, Software Engineering, Natural Language Processing, Language Technologies, Data Mining, Information Retrieval, Web-Based Architectures, Machine Translation, Algorithms, and related Computer Science topics.

**Other initiatives:** Created the Center for Machine Translation at CMU in 1986, and the Language Technologies Institute in 1996. Co-creator & co-director of the Universal Library and million-book project (US, China, India). MT Summit chair 1991, Co-designer of interactive pinpointing speech tutor. Co-creator & co-PI of new Computational Biolinguistics Initiative at CMU.

**Industrial Consulting:** Meaningful Machines (participated in designing the context-based machine translation methods, 2002-2009), Industrial Scientific (data mining to improve workplace safety, 2008-present), Carnegie Speech Inc. (business and technology strategy for intelligent language tutoring, 2002-present) Carnegie Group Inc (expert systems & financial data mining: 1984-1997), Citicorp (financial data mining, real time transactions, new IT technology insertion: 1990-1998), Lycos Inc. (launching the internet search engine 1998-1999), Vivisimo (2003-2006, scientific advisory board), Searchline (launched the new search engine, 2002-2004), Wisdom Technologies (financial optimization and data mining for corporate treasuries, large banks, etc. 1995-2003), Dynamix Technologies (designed their large-scale data mining engine with applications to Homeland Security, AR/AP financial optimization, transactional optimization in bond trading and in re-insurance, pattern discovery in network-wire-transfer streams, syndromic surveillance, etc. 2000-present), Peak Strategy (financial analytics, investment, mining, 2005-2007), Boeing (designed their intensive data mining course), Citibank (technology advisory board for 10 years, focusing on text and data mining, fraud detection, optimization methods, etc.), plus about 10 other shorter-term engagements in data mining in industry, including financial data mining: transactional fraud detection, instant-credit bad-debt minimization, collection effectiveness, cash-flow optimization (sweep/invest/float), data mining for risk/cost tradeoff minimization (FX, interest rate, counterparty, debt, etc), and so on. During these engagements process I designed or co-designed three data mining engines, and evaluated and help improve numerous other data mining engines, including the machine learning algorithms at their core.

**Miscellaneous:** Gave over 500 invited or refereed-paper presentations (colloquia, seminars, panels, addresses, conferences, key-notes, etc.). Received the *IJCAI Best Paper Award* in 1997 for translanguing information retrieval. Received the CMU Computer Science Department's teaching award (1987), the Sperry Fellowship for excellence in AI research (1986), unsolicited gifts from Alcoa and Hughes corporations for research in machine learning, and a "recognition of service" award from the ACM for the SIGART presidency (1983-1985). Provided congressional testimony on machine translation (1990). Leader of the NSF/JTEC study group on Japanese machine translation science and technology (1990-91). Principal investigator or major participant in research grants and contracts totaling over 90 million dollars since 1979 at the CMU School of Computer Science, Center for Machine Translation, and Language Technologies Institute.

**Expert witness:** Provided expert testimony and depositions, expert reports, advice, consulting , etc. in several cases involving intellectual property including: software design and copyrights, patents for data mining, patents for search engine algorithms and methods, speech recognition, integrated software systems, computational and statistical applications in finance, statistical machine learning, text mining, text processing, natural language, etc.

**Patents:** Inventor in several issued patents, provided advice on patentability of new software and methods, helped draft software-related patents, conducted prior art searches, composed responses to patent examiners, evaluated validity of issued patents As expert witness provided opinions and reports on patent infringement, patent validity (anticipation, obviousness), claim constructions, Inter Partes Reviews, etc.

## PhD Advisees & co-Advisees

1. Masaru Tomita, Professor and Dean, Keio University, Computer Science and Biology
2. Steven Minton, USC-ISI & CTO of Fetch Inc
3. Manuela Veloso, Professor, CMU Computer Science
4. Jack Mostow, Research Professor, CMU Robotics
5. Michael Mauldin, Founder of Lycos Inc. (and former faculty at CMU)
6. Oren Etzioni, Professor, U of Washington (and founder of Metacrawler)
7. Robert Frederking, Sr. System Scientist, CMU Language Technologies Institute
8. Alex Hauptmann, Research Professor, CMU Computer Science
9. Klaus Gross, Chief Scientist, Haley Enterprises
10. Wei-Min Shen, USC-ISI and faculty at USC Computer Science
11. Eric Nyberg, Professor, CMU Language Technologies Inst
12. Ralf Brown, Sr. System Scientist, CMU Language Technologies Institute
13. Craig Knoblock, USC-ISI and faculty at USC Computer Science
14. Akira Ushioda, Fujitsu Labs, Manager Language Technologies
15. Mark Perlin, CEO Cybergenetics
16. Daniel Kuokka, Senior researcher, Tektronix
17. Yolanda Gil, USC-ISI, senior researcher
18. Xuemei Wang, Lockheed Martin & ISLE Computing
19. Robert Joseph, Verizon Communication, senior researcher
20. Jill Fain-Lehman, Founder of Autism Technology, Disney Pittsburgh
21. Eugene Fink, Senior Sys Scientist CMU (formerly Asst Prof, U of Florida)
22. Angela Kennedy, President Carnegie Speech (formerly CEO Wisdom Technologies)
23. Alicia Perez, Faculty at Universidad Catolica de Salta, Argentina
24. Jim Blythe, Researcher, USC-ISI
25. Alex Franz, Google Inc.
26. Yan Qu, Senior Researcher, Oracle Corp
27. Jade Goldstein, US DoD research laboratory
28. Boyan Onyskevich, US DoD research laboratory, senior manager
29. Michael Mateas, Faculty, University of CA.
30. Kathreina Probst, Faculty at Georgia Tech
31. Yan Liu, Faculty at University of Southern Cal.
32. Lucian Lita, Siemens Princeton Research Lab
33. Paul Bennett, Microsoft Research Labs
34. Chun Jin, AT&T Research
35. Ariadna Font-Llitos, IBM, Big Data Labs
36. Ulas Bardak, Postdoctoral fellow, Tokyo University
37. Christian Monson, Oregon Graduate Institute
38. Cenk Gazen, Fetch Inc. Los Angeles
39. Monica Rogati, Linked-In, manager of R&D
40. Vasco Pedro, CEO of Bueda Inc.
41. Meryem Pinar Donmez, Salesforce R&D
42. Jingrui He, Faculty, Stevens Institute
43. Jae-Dong Kim, Google Pittsburgh
44. Rashmi Gangadharaiah, Microsoft Research Labs
45. Oznur Tastan, Microsoft Research Labs
46. Jonathan Elsas, Google Pittsburgh
47. Vamshi Ambati, AT&T Research
48. Bin Fu, Google, NYC
49. Mehrbod Sharifi, Google Pittsburgh
50. Ravi Starzl. CMU faculty
51. Xi Chen, UC Berkeley Postdoc, then NYU Faculty
52. Balakrishnan, Sevaraman, UC Berkeley Postdoc.
53. Liu Yang, CMU Postdoc.
54. Mohit Kumar, Flipkart Inc.
55. Selen Uguroglu, Apple Inc.
56. Luis Marujo

## Publications

1. Wei-Yu, A. Kılınç-Karzan, F., and Carbonell, J., “Saddle Points and Accelerated Perceptron Algorithms”, *Proc. of International Conference on Machine Learning (ICML)*, Beijing, 2014.
2. Flanigan, J., Thomson, S., Carbonell, J., Dyer, C., and Smith, N. “A Discriminative Graph-Based Parser for the Abstract Meaning Representation” In *Proc. of the Association for Computational Linguistics Conference (ACL)*, Baltimore, 2014. (Best paper honorable mention).
3. KhudaBukhsh, A., Jansen, P. and Carbonell, J., “Detecting Non-Adversarial Collusion in Crowd Sourcing” In *Proc. of the Conference on Human Computation and Crowdsourcing (HCOMP)*, Pittsburgh, 2014.
4. Marujo, L., Portelo, J., Martin des Matos, D., Neto, J., Gershman, A., Carbonell, J., Trancoso, I., Raj, B., “Privacy Preserving Important Passage Retrieval”, In *Proc of the Privacy in Information Retrieval Workshop, SIGIR*, 2014.
5. Kshirsagar, M., Carbonell, J. and Klein-Seetharaman, J., “Multi-Task Learning for Host-pathogen Protein Interactions”, *Proc of ISMB 2013 and Bioinformatics*, 2013.
6. Yang, L., Blum, A., and Carbonell, J. “Learnability of DNF with Representation-Specific Queries.” *Innovations in Theoretical Computer Science (ITCS)*, 2013.
7. Yang, L., and Carbonell, J., “Buy-in-Bulk Active Learning” *Proc of Advances in Neural Information Processing Systems (NIPS)*, 2013.
8. Kshirsagar, M., Carbonell, J. and Klein-Seetharaman, J., “Multisource Transfer Learning for Host-Pathogen Protein Interaction Prediction in Unlabeled Tasks”, *NIPS Wkshp on Machine Learning for Computational Biology*, 2013.
9. Flanigan, J., Dyer, C., and Carbonell, J., “Large-Scale Discriminative Training for Statistical Machine Translation Using Held-Out Line Search”, *Proc. of North American AC (NAACL)*, 2013.
10. Duneitz, J., Levin, L. and Carbonell, J., “The Effects of Lexical Resource Quality on Preference Violation Detection”, *Proc. of North American ACL (NAACL)*, 2013.
11. Starzl, R., Brandacher, G., Lee, A., Carbonell, J., Zhang, W. Schnieder, J. Gorantla, B. Schneeberger, S., Zheng, X. “Review of the Early Diagnoses and Assessment of Rejection in Vascularized Composite Allotransplantation”, *Clinical and Developmental Immunology*, Article ID 402980, 2013.
12. Starzl, R., Wolfram, D., Samora, R. Jefferson, B., Barclay, D., Ho, C., Brandacher, G., Schneeberger, S., Lee, A’, Carbonell, J., Bodovitz, Y., “Tissue-Specific Patterns of Caspase-1 and Cytokines in Excisional Wounds are Altered by Shock in Skin and Muscle”, *Journal of Critical Care*, Vol 28, Issue 1, 2013.
13. Ribeiro, R., Marujo, L., Martins de Matos, D., Neto, P., Gershman, A., Carbonell, J., “Self Reinforcement for Important Passage Retrieval”, In *Proceedings of ACM SIGIR Conference*, Dublin, 2013.
14. Chen, X., Liu, H., and Carbonell, J., “Structured Sparse Canonical Correlation Analysis”, *International Conf, on AI and Statistics (AISTATS)*, 2012.
15. Yang, L. Hanneke, S. and Carbonell, J., “A Theory of Transfer Learning with Applications to Active Learning,” *Machine Learning Journal*, 2012, DOI: 10.1007/s10994-012-5310-y
16. Chen, X., He, J., Lawrence, R., and Carbonell, J., “Adaptive Multi-Task Sparse Learning with an Application to fMRI Study”, *SIAM International Conference on Data Mining (SDM)*, 2012.
17. Chen, X., Lin, Q., Kim, S., Carbonell, J., Xing, E., “Smoothing Proximal Gradient Method for General Structured Sparse Learning”, *Annals of Applied Statistics*, 2012. (Full version.)
18. Ambati, V., Vogel, S. and Carbonell, J., “Collaborative Workflow for Crowdsourcing Translation”, *Proc of ACM Conference on Computer Supported Cooperative Work*, Washington, USA. 2012.

19. Kshirsagar, M., Carbonell, J. and Klein-Seetharaman, J., "Transfer learning based methods towards the discovery of host-pathogen protein-protein interactions" *Proc of ISMB*, 2012.
20. Kshirsagar, M., Carbonell, J. and Klein-Seetharaman, J., "Techniques to cope with missing data in host-pathogen protein interaction prediction" *J of Bioinformatics* 2012 (also presented at ECCB 2012).
21. Starzl R, Zhang W, Wang Y, Brandacher G, Schneeberger S, Gorantla V, Carbonell J, Barclay D, Vodovotz Y, Zheng XX. "Inflammatory Biomarker Patterns Identify Specific Types of Rat Skin Rejection." *3rd International Conference on Transplantomics and Biomarkers in Organ Transplantation*. March 2012.
22. Starzl R, Zhang W, Wang Y, Brandacher G, Schneeberger S, Gorantla V, Carbonell J, Barclay D, Vodovotz Y, Zheng XX. "Distinctive Immune Signaling Patterns and Factors in Rat Skin Rejection." *American Transplant Congress*. June 2012.
23. Fu, B., Fink, E., Gibson, G., and Carbonell J., "Indexing and Fast Near-Matching of Billions of Astronomical Objects", *Proc. of IASDS*, 2012.
24. Fu, B., Fink, E., Gibson, G., and Carbonell J., "Exact and Approximate Computation of a Histogram of Pairwise Distances between Astronomical Objects", *Proc of AstoHPC*, 2012.
25. Uguroglu, S., M. Doyle, R. Biedermann, J. Carbonell. "Cost-sensitive Risk Stratification in the Diagnosis of Heart Disease." *Proc of IAAA*, 2012.
26. Yang, L., and Carbonell, J. "Buy-in-Bulk Active Learning." *Tech report CMU-ML-12-110.*, 2012.
27. Yang, L. Hanneke, S., and Carbonell, J." Bounds on the Minimax Rate for Estimating a Prior over a VC Class from Independent Learning Tasks". *Tech report CMU-ML-12-112.*, 2012.
28. Marujo, L., Ling, W., Gershman, A., Carbonell, J., Neto, J., Martins de Matos, D., "Recognition of Named-Event Passages in News Articles," In *Proceedings of 24th International Conference on Computational Linguistics (COLING)*, Mumbai, 2012.
29. Marujo, L., Ribeiro, R., Martins de Matos, D., Neto, J., Gershman, A., Carbonell, J., "Key Phrase Extraction of Lightly Filtered Broadcast News," In *Proceedings of 15th International Conference on Text, Speech and Dialogue (TSD)*, Brno, Czech Republic, 2012.
30. Marujo, L., Gershman, A., Carbonell, J., Frederking, R., Neto, J., "Supervised Topical Key Phrase Extraction of News Stories using Crowdsourcing, Light Filtering and Co-reference Normalization," In *Proceedings of the 8th International Conference on Language Resources and Evaluation (LREC)*, Istanbul, 2012
31. Balakrishnan, S., Kamisetty, H., Carbonell, J., Lee, S., Langmead, C., "Learning Generative Models for Protein Fold Families", *Proteins*, Vol 79, Issue 4, pp 1061-1078, 2011,
32. Chen, X., Qi, Y., Bai, Q., Carbonell, J. "Sparse Latent Semantic Analysis", *Proc of SIAM International Conference on Data Mining (SDM)*, 2011.
33. Chen, X., Lin, Q., Kim, S. Carbonell, J. Xing, P. "Smoothing Proximal Gradient Method for Generalized Structure Learning" *Proc of Uncertainty in Artificial Intelligence Conference (UAI)*, 2011. (Short version)
34. Yang, L, Hanneke, S., Carbonell, J. "The Identifiability of Priors from Bounded Sample Sizes with Applications to Transfer Learning", *Proc of the 24<sup>th</sup> Proc of the Annual Conference on Learning Theory (COLT)*, Budapest, 2011.
35. Yang, L. Hanneke, S., Carbonell, J., "The Sample Complexity of Self-Verifying Bayesian Active Learning", *Proc of the International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2011.
36. Uguroglu, S, and J. Carbonell. "Feature Selection for Transfer Learning." *Proc of ECML/PKDD* (3) 2011. 430-442.
37. Kshirsagar, M., Zhao, Z., Iia, J.m Tastan, O., Singh, I., Carbonell, J. and Klein-Seetharaman, J., "Virus Interactions with Huamn Signal Transduction Patterns", *International Jouinral of Computational Biology and Drug Desigh* (4(1): 83-105, 2011.

38. Ambati, V., Vogel S., and Carbonell, J., "Multi-Strategy Approaches to Active Learning for Statistical Machine Translation", *Proc of the the 13th Machine Translation Summit*, Xiamen, China. 2011
39. Ambati, V., Hewavitharana, S., Vogel, S., Carbonell, J., "Active Learning with Multiple Annotations for Comparable Data Classification Tasks", *Proc of Comparable Corpora workshop of ACL*, 2011.
40. Ambati V., Vogel, S., Carbonell, J. "Towards Task Recommendation in Micro-Task Market", *Proc of 3<sup>rd</sup> Workshop on Human Computation of AAAI*, 2011.
41. Gopal, S., Yang, Y., Salomatin, K, and Carbonell, J., "Statistical Learning for file-type Identification," *International Conference on Machine Learning Applications (ICMLA)*, 2011.
42. Marujo, L., Bugalho, M., Neto, P., Gershman, A., Carbonell, J., "Hourly Traffic Prediction of News Stories", In *3rd International Workshop on Context-Aware Recommender Systems* held as part of the 5th ACM RecSys Conference, Chicago, 2011.
43. Balakrishnan S., Tastan O., Carbonell J., and Klein-Seetharaman J., "Alternative Paths in HIV-1 Targeted Human Signal Transduction Pathways." *BMC Genomics*, Vol. 10. 2010. (Shorter version in *International Conference on Bioinformatics*, 2009.)
44. Balakrishnan, S., Kamisetty, H, Carbonell, J., Lee, S. and Langmead, C., "Learning Networks of Statistical Couplings in Protein Fold Families using L1-regularization", *Proc. of Structural Bioinformatics and Computational Biophysics*, 2010.
45. He, J., and Carbonell, J. "Co-Selection of Features and Instances for Unsupervised Rare Category Analysis." *Proceedings of the SIAM International Conference on Data Mining*, Columbus, OH 2010
46. Donmez, P., Carbonell, J., Schneider, J., "A Probabilistic Framework to Learn from Multiple Annotators with Time-Varying Accuracy", *Proceedings of the SIAM International Conference on Data Mining*, Columbus, OH 2010.
47. Donmez, P. and Carbonell, J. "From Active to Proactive Learning" in *Advances in Machine Learning I*, Koronacki, J, Ras, Z. Wierchoin S, and Karprzyk (eds.), Studies in Computational Intelligence Series, Vol. 262. pp 97-120.. Springer, 2010.
48. Xiong, L., Chen, X., Huang, T., Schneider, J., Carbonell, J., "Temporal Collaborative Filtering with Bayesian Probabilistic Tensor Factorization", *Pro. of the SIAM International Conf. on Data Mining*, Columbus, OH, 2010.
49. Carbonell, J. "Intelligent Resource Collection for Low-Density Languages" (extended abstract of invited talk), In *Proceedings of LREC*, 2010.
50. Chen, X., Liu, Y. Liu, H., Carbonell, J., "Learning Spatial-Temporal Varying Graphs with Applications to Climate Change Analysis", in *Proc of the Twenty-fourth Conference on Artificial Intelligence (AAAI)*, 2010.
51. Bilotti, M., Elsas, J., Carbonell, J., and Nyberg, E., "Rank Learning for Factoid Question Answering with Linguistic and Semantic Constraints", *Proc. of the 19<sup>th</sup> ACM Internal Conference on Information and Knowledge Management (CIKM)*, 2010.
52. Zhao Z, Xia J, Tastan O, Singh I, Kshirsagar M, Carbonell J, Klein-Seetharaman J. "Virus Interactions with Human Transduction Pathways", *International Journal of Computational Biology Drug Discovery*. 2011;4(1):83-105. doi: 10.1504/IJCDD.2011.038658. Epub 2011 Feb 17.PM ID:21330695.
53. Gangadharaiah, R., Brown, R. and Carbonell, J. "Monolingual Distributional Profiles for Word Substitution in Machine Translation", *The 23rd International Conference on Computational Linguistics*, (COLING2010), China, August 2010.
54. Gangadharaiah R., Brown, R. and Carbonell, J., "Automatic Determination of Number of clusters for creating Templates in Example-Based Machine Translation", *The 14th Annual Conference of the European Association for Machine Translation*, (EAMT2010), France, May 2010.

55. Chen, X., Qi, Y., Bai, B., Lin, Q., Carbonell, J., “Learning Preferences with Millions of Parameters by Enforcing Sparsity”, International Conference on Data Mining (ICDM), 2010.
56. Chen, X., Lin, Q., Kim, S., Carbonell, J., and Xing, E., “An Efficient Proximal-Gradient Method for General Structured Sparse Learning”, ArXiv: 1005.4717, 2010 (also in NIPS workshop on Sparse Modeling).
57. Chen, X., Kim, S., Lin, Q., Carbonell, J., Xing, E., “Graph-Structured Multi-Task Regression and an Efficient Optimization Method for General Fused Lasso”, arXiv:1005.3579, 2010.
58. Chen, X., Bai, B., Qi, Y., Lin Q., and Carbonell. J., “Sparse Latent Semantic Analysis”, NIPS Workshop on Practical Applications of Sparse Modeling, 2010.
59. Ambati, V., Vogel, S. and Carbonell, J., "Active Learning-Based Elicitation for Semi-Supervised Word Alignment", In *Proceedings of the Association for Computational Linguistics (ACL)*, Uppsala, Sweden, 2010.
60. Ambati, V., Vogel, S., and Carbonell, J., "Active Semi-Supervised Learning for Improving Word Alignment", In *Proceedings of the Active Learning for NLP Workshop, NAACL*, Los Angeles, USA, 2010.
61. Ambati, V., Vogel, S. and Carbonell, J., “Active Learning and Crowd-Sourcing for Machine Translation”, *Proceedings of LREC*, 2010.
62. Kim, J., Brown, R. and Carbonell, J. "Chunk-Based EBMT". In *Proceedings of the 14th Workshop of the European Association for Machine Translation*, Raphael, France, 2010.
63. Mohamed, T., Carbonell, J. and Ganapathiraju, M., “Active Learning for Human Protein-Protein Interaction Prediction. *BMC Informatics*, Vol 11, Supp 1, 2010.
64. Osmanbeyogly, H., Wehner, J., Carbonell, J. and Ganapathiraju, M., “Active Learning for Membrane Protein Structure Prediction”, *BMC Informatics*, Vol 11, Supp 1, 2010.
65. Yang, L., Hanneke, S., Carbonell, J., “Bayesian Active Learning Using Arbitrary Binary-Valued Queries”, *Proc of the 21<sup>st</sup> International Conference on Algorithmic Learning Theory (ALT)*, 2010.
66. Xiong, L, Chen, X., Huang, T., Schneider, J., and Carbonell, J., “Time-Evolving Collaborative Filtering”, SIAM International Conference on Data Mining (SDM), 2010.
67. Yang, L., Hanneke, J., and Carbonell, J., “The Sample Complexity of Self-Verifying Bayesian Active Learning”, *Tech Report CMU-ML-10-105*, 2010.
68. Sharifi, M., Finke, E., and Carbonell, J. “Learning Personalized Security Settings”, Proceedings of the IEEE SMC, 2010.
69. Qi Y, Tastan O, Carbonell JG, Klein-Seetharaman J, Weston J., “Semi-Supervised Multi-Task Learning for Predicting Interactions Between HIV-1 and Human Proteins,” *Bioinformatics*. 2010. Sep 15;26(18):i645-52. PMID: 20823334.
70. Balakrishnan, S., Kamisetty, H., Carbonell, J., Langmead, C., “Structure Learning Generative Models for Protein Fold Families” Tech report CMU-CS-09-177. 2009.
71. Yang, L. and Carbonell, J., “Cost Complexity of Proactive Learning via a Reduction to Realizable Active Learning”, Tech report CMU-ML-09-113. 2009.
72. Yang, L. and Carbonell, J., “Adaptive Proactive Learning with Cost-Reliability Tradeoff”, *Tech report CMU-ML-09-114*, 2009.
73. Donmez, P., Carbonell, J. and Schneider, J. “Efficiently Learning the Accuracy of Labeling Sources for Selective Sampling”, *Proceedings of the 15<sup>th</sup> ACM Knowledge and Data Discovery Conference (KDD-09)*, 2009.
74. Donmez, P., Carbonell, J. “Active Sampling for Rank Learning via Optimizing the Area Under the ROC Curve”, In *Proceedings of the 31st European Conference on Information Retrieval (ECIR '09)*, Toulouse, France 2009.

75. He, J. and Carbonell, J. "Prior-Free Rare Category Detection" In *Proceedings of the SIAM International Conference on Data Mining (SDM09)*, 2009.
76. Chen, X., Pan, W., Kwok, J. and Carbonell, J. "Accelerated Gradient Method for Multi-Task Sparse Learning Problems", *Proceedings of the International Conference on Data Mining. (ICDM)*, 2009.
77. Tastan O, Qi Y, Carbonell, J, and Klein-Seetharaman, J. "Prediction of Interactions between HIV-1 and Human Proteins by Information Integration." In *Proceedings of the Pacific Symposium on Biocomputing* 14:516-527, 2009.
78. Elsas, J. and Carbonell, J., "It Pays to be Picky: An Evaluation of Thread Retrieval in Online Forums," *Proceedings of the 32nd Annual International ACM SIGIR Conference on R&D on Information Retrieval*, 2009.
79. Elsas, J., Donmez, P., Callan, J. and Carbonell, J. "Pairwise Document Classification for Relevance Feedback", In *Proceedings of TREC*, 2009
80. Fink, E., Sarin, A., and Carbonell, J. "Analysis of uncertain data: Smoothing of histograms", In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009
81. Gershman, A. Fink, A., Fu, B., and Carbonell, J. "Analysis of uncertain data: Evaluation of given hypotheses" In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009
82. Gershman, A., Fink, E., Fu, B. and Carbonell, J. "Analysis of uncertain data: Selection of probes for information gathering", In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009.
83. Gelernter, J. Cao, D., Lu, R. Fink, E. and Carbonell J. "Creating and visualizing fuzzy document classification." In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, 2009
84. Ambati, V., Lavie, A. and Carbonel, J. "Extraction of Syntactic Translation Models from Parallel Data using Syntax from Source and Target Languages." In *Proceedings of Machine Translation Summit XII*, Canada, 2009.
85. Ambati, V., and Carbonell, J. "Proactive Learning for Building Machine Translation Systems for Minority Languages." *NAACL HLT Workshop on Active Learning for NLP*. Boulder, CO. 2009.
86. Tastan O., Qi Y., Carbonell J., and Klein-Seetharaman J., "Prediction of HIV-1 Human Protein Interactome" (extended abstract), *VIII European Symposium of The Protein Society*, Zurich. June, 2009.
87. Tastan O., Carbonell J., and Klein-Seetharaman J. "Refining the HIV-1, Human Protein Interaction Network with Multiple Expert Opinions" (extended abstract), *The 23rd Annual Meeting of the Groups Studying the Structures of AIDS-Related Systems and their Application to Targeted Drug Design*, Bethesda, MD, Jun 25-26, 2009.
88. Rashmi G., Brown, R. and Carbonell, J. "Active Learning in Example-Based Machine Translation", *Proc. Of The 17th Nordic Conference on Computational Linguistics*, Odense, Denmark, May 2009.
89. Donmez, P., Carbonell, J. "Proactive Learning: Cost-Sensitive Active Learning with Multiple Imperfect Oracles", In *Proceedings of the 17th ACM Conference on Information and Knowledge Management*. Napa Valley, 2008.
90. Donmez, P. and Carbonell, J. "Optimizing Estimated Loss Reduction for Active Sampling in Rank Learning", In *Proceedings of the International Conference in Machine Learning*, Helsinki, 2008.
91. Cheng, B. and Carbonell, J. "Statistical Detection of Resistance-Associated Mutations Using Techniques from Human Language Technologies". *XVII International HIV Drug Resistance Workshop*, Sitjes, Spain. 2008.
92. Freed, M., Carbonell, J., Gordon, G., Hayes, J., Meyers, B., Siewiorek, D., Smith, S., Steinfeld, A. and Tomasic. A., "RADAR: A Personal Assistant that Learns to Reduce Email Overload", in *Proceedings of the 23<sup>rd</sup> American Association of Artificial Intelligence Conference*, Chicago, 2008.
93. Jin, C. and Carbonell, J. "Predicate Indexing for Incremental Multi-Query Optimization", In *Proceedings of the ISMIS 2008 Symposium*, Springer LNCS series, 2008.



94. He, J, and Carbonell, J. "Rare Class Discovery Based on Active Learning". In *Proceedings of the 10<sup>th</sup> International Symposium on Artificial Intelligence and Mathematics* (SIAM), Florida, 2008.
95. Donmez, P. and Carbonell, J. "Paired Sampling in Density-Sensitive Active Learning". In *Proceedings of the 10<sup>th</sup> International Symposium on Artificial Intelligence and Mathematics* (SIAM), Florida, 2008.
96. Monson, C., Font-Llitjos, A., Levin, L, Lavie, A. Alvarez, A., Aaranovich, R., Carbonell, J., Frederking, R., Peterson, E., Probst, K, and Ambati, V. "Linguistic Structure and Bilingual Informants to Induce Machine Translation of Lesser-Resourced Languages", in *Proceedings of LREC*, 2008.
97. Monson, C., Lavie, A., Carbonell, J. and Levin L., "Evaluating an Agglutinative Segmentation Model for ParaMor", In *Proceedings of the 10<sup>th</sup> Meeting of the ACL Special Interest Group in Computational Morphology and Phonology* (SIGMORPHON), 2008.
98. Carvalho, V. Elsas, J., Cohen, W. Carbonell, J., "Suppressing Outliers in Pairwise Preference Ranking," *Proceedings of the 17th annual ACM Conference on Information and Knowledge Management*, 2008
99. Elsas, J., Arguello, J., Callan J. and Carbonell, J., "Retrieval and Query-Expansion Models for BLOG-Feed Search", *Proceedings of the 31<sup>st</sup> ACM's SIGIR Conference on Information Retrieval*, 2008.
100. Arguello, J, Elsas, J. Callan, J., and Carbonell, J. "Document Representation and Query Expansion Models for Blog Recommendation," *Proceedings of the Second International Conference on Weblogs and Social Media (ICWSM)*, 2008. (Best Paper nominee)
101. Carvalho, V., Elsas, J, Cohen, W., and Carbonell, J., "A Meta-Learning Approach for Robust Rank Learning", *Proceedings of the SIGIR Workshop on Learning to Rank for Information Retrieval*. 2008.
102. Elsas, J. Carvalho, R., and Carbonell, J. "Fast Learning of Document Ranking Functions with the Committee Perceptron". In *Proceedings of the 1<sup>st</sup> ACM International Conference on Web Search and Data Mining*, Stanford U, CA, 2008.
103. Fu, B., Fink, E. and. Carbonell, J. "Analysis of uncertain data: Tools for representation and processing", In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 3256-3260, 2008.
104. Carpentier, A., Sharifi, M., Fink, E. and Carbonell, J., "Scheduling with uncertain resources: Learning to ask the right questions", In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 2543-2547, 2008.
105. Gardiner, S., Fink, E. and Carbonell, J., "Scheduling with uncertain resources: Learning to make reasonable assumptions", In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 2554-2559, 2008.
106. Elsas, J. Arguello, J. Callan, J, and Carbonell, J. "Retrieval and Feedback Models for BLOG Distillation and Mining", In *Proceedings of the Text Retrieval Conference (TREC)*, National Institute of Standards and Technology, MD, 2007 (Top performing system in the TREC BLOG-distillation track).
107. He, J, and Carbonell, J. "Nearest-Neighbor Based Active Learning for Rare Category Detection", In *Proceedings of the 21<sup>st</sup> Annual Conference on Neural Information Processing (NIPS-2007)*, Vancouver, Canada. 2007
108. Donmez, P. Carbonell, J. and Bennett, P. "Dual-Strategy Active Learning", In *Proceedings of the 18<sup>th</sup> Annual European Conference on Machine Learning (ECML-2007)*, Warsaw, Poland. 2007.
109. Liu, Y. Carbonell, J., and Gopalakrishnan, V. "Protein Quaternary Fold Recognition Using Conditional Graphical Models." In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI-07)*. Hyderabad, India. 2007.
110. Lita, L. and Carbonell, J., "Cluster-Based Selection of Statistical Answering Strategies." In *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI-07)*. Hyderabad, India. 2007.
111. He, J., Carbonell, J. and Liu, Y., "Graph-Based Semi-Supervised Learning as a Generative Model." In *Proceedings*

of the Twentieth International Joint Conference on Artificial Intelligence (IJCAI-07). Hyderabad, India. 2007.

112. Cheng B and Carbonell J., "Combining N-grams and Alignment in G-Protein Coupling Specificity Prediction" *Advances in Bioinformatics & Computational Biology: 5th Asia-Pacific Bioinf Conf*, Imperial College Pr, p. 363-372. 2007.
113. Monson, C., Carbonell, J., Lavie, and Levin, L., "ParaMor: Finding Paradigms across Morphology", In *Proceedings of CLEF Morpho-Challenge Workshop*, 2007.
114. Monson, C., Carbonell, J., Lavie A., and Levin, L., "ParaMor: Minimally-Supervised Induction of Paradigm Structure and Morphological Analysis", In *Proceedings of the 9<sup>th</sup> Meeting of the ACL's SIGMORPHON*, 2007.
115. Carbonell, J., Klein, S., Miller, Steinbaum, M., D., Grassiany, T., and Frey, J., "Context-Based Machine Translation" In *Proceedings of the Association for Machine Translation of the Americas (AMTA-2006)*, Boston, 2006.
116. Liu Y, Carbonell J, Weigle P, Gopalakrishnan. V, "Segmentation Conditional Random Fields (SCRFS): A New Approach for Protein Fold Recognition," *Journal of Computational Biology*, Vol. 13, No. 2, 2006. [Longer version of RECOMB-05 paper.]
117. Jin, C. and Carbonell J., "ARGUS: Efficient Scalable Continuous Query Optimization for Large-Volume Data Streams," In *Proceedings of the 10<sup>th</sup> International Database Engineering & Applications Symp. (IDEAS-06)*, 2006.
118. Jin, C. and Carbonell J., "Incremental Aggregation on Multiple Continuous Queries", In *Proceedings of the 16th International Symposium on Methodologies for Intelligent Systems (ISMIS-06)*, Springer LNCS book series, 2006
119. Carbonell, J., Fink, E. Jin, C., Gazen, C., Jennings, M., Saxena A., Satish, V., Ananthraman, S., Dietrich D., Mani, G., Tittle J., and Durbin, P. "Scalable Data Exploration and Novelty Detection", In *Novel Intelligence from Massive Data Conference (NIMD-06)*, Arlington VA, 2006.
120. Pedro V., Nyberg E. and Carbonell, J., "Federated Ontology Search", In *Proceedings of Semantic Information Integration and Knowledge Discovery*, Indonesia, 2006.
121. Rashmi Gangadharaiah, Ralf Brown and Jaime Carbonell, "Spectral Clustering for Example-Based Machine Translation", Proc. Of *HLT-NAACL*, New York, USA, 2006.
122. Fink, E., Bardak, U., Rothrock, B., and Carbonell, J., "Scheduling with Uncertain Resources: Collaboration with the User." In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 11-17, 2006.
123. Fink, E., Jennings, M., Bardak, U., Oh, J., Smith, S., and Carbonell, J., "Scheduling with Uncertain Resources: Search for a Near-Optimal Solution. In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 137-144, 2006.
124. Bardak, U., Fink, U., and Carbonell, J., "Scheduling with Uncertain Resources Part 2: Representation and Utility Function", In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 1486-1492, 2006.
125. Bardak, U., Fink, E., Martens, C., and Carbonell, J., "Scheduling with Uncertain Resources Part 3: Elicitation of Additional Data". In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 1493-1498, 2006.
126. Jin, C., and Carbonell, J. "ARGUS: Efficient Scalable Continuous Query Optimization for Large-Volume Data Streams", *Technical Report, CMU-LTI-06-005, Carnegie Mellon Univ.* 2006.
127. Font-Lijtos, A. and Carbonell, J. "Automating Post-Editing to Improve MT Systems" In *Association for Machine Translation of the Americas (AMTA-2006), Automated Post Editing Workshop*, Boston, 2006.
128. Carbonell, J. G., A. Lavie, L. Levin and A. Black, "Language Technologies for Humanitarian Aid," In *Technology for Humanitarian Action*, Cahill, K. (Ed.), Fordham University Press, pp. 111-138, ISBN 0-8232-2393-0, 2005.
129. Carbonell, J., Fink, E., Jin, C., Gazen, C., Ananthraman, S., Hayes, P., Mani, G., Dietrich, D., "Exploring massive

structured data in ARGUS”, *Novel Intelligence from Massive Data (NIMD-2005)*, Orlando, FL, 2005.

130. Liu Y, Xing E., Carbonell J, “Predicting Protein Folds with Structural Repeats Using a Chain Graph Model,” *Proceedings of the International Conference on Machine Learning (ICML05)*, 2005.
131. Liu Y, Carbonell J, Weigele P, Gopalakrishnan. V, “Segmentation Conditional Random Fields (SCRFs): A New Approach for Protein Fold Recognition,” *Proceedings of the ACM International conference on Research in Computational Molecular Biology (RECOMB05)*, 2005.
132. Cheng BY, Carbonell JG, Klein-Seetharaman J, “A Text-Inspired Machine Learning Approach for Identification of Transmembrane Helix Boundaries,” *15th International Symposium on Methodologies for Intelligent Systems*, Saratoga Springs, New York, USA, 2005.
133. Bennett, P., and Carbonell, J. “Detection Action-Items in Email”, In *Proceedings of the 28th Annual International ACM SIGIR Conference*, Salvador, Brazil, ACM Press, August, 2005.
134. Bennett, P. and Carbonell, J., “Feature Representation for Effective Action-Item Detection” In *Beyond Bag-of-Words Workshop at the 28th International ACM SIGIR Conference*, pp. 63-70, Salvador, Brazil, ACM Press, August 2005.
135. Kim J, Brown R, Jansen P., Carbonell J, “Symmetric Probabilistic Alignment for Example-Based Translation,” *Proceedings of the Tenth Workshop of the European Association for Machine Translation (EAMT)*, Budapest, Hungary, May 2005.
136. Font-Llitjos A, Carbonell J, Lavie, A, “A Framework for Interactive and Automatic Refinement of Transfer-based Machine Translation,” *Proceedings of the 10th European Association for Machine Translation Conference (EAMT)*, Budapest, Hungary, May 2005.
137. Jin, C., Carbonell, J. Hayes, P., "ARGUS: Rete + DBMS = Efficient Persistent Profile Matching on Large-Volume Data Streams, In *Proceedings of the 15th International Symposium on Methodologies for Intelligent Systems (ISMIS)*, pages 142-151, 2005. (Extended version in tech report: CMU-LTI-04-181, Carnegie Mellon Univ., 2004.)
138. Liu Y, Carbonell, J, Klein-Seetharaman J, Gopalakrishnan V., “Comparison of Probabilistic Combination Methods for Protein Secondary Structure Prediction,” *Bioinformatics*, Vol. 20(17), Nov 2004, pp. 3099-107.
139. Cheng B., Carbonell J., Klein-Seetharaman J, “Protein Classification based on Text Document Classification Techniques.,” *Proteins: Structure, Function and Bioinformatics, Abstracts*, 2004.
140. Cheng B., Carbonell J., Klein-Seetharaman J, “Prediction of G-Protein Coupling Specificity of GPCR,” *Proceedings of ISMB / ECCB*, Glasgow, Scotland, 2004.
141. Font-Llitjos A, Probst K, Carbonell J, “Error Analysis of Two Types of Grammar for the Purpose of Automatic Rule Refinement,” *Proceedings of the 6th Conference of the Association for Machine Translation in the Americas (AMTA)*, 2004.
142. Lita L.V., Carbonell J., “Unsupervised Question Answering Data Acquisition From Local Corpora,” *Proceedings of the Thirteenth Conference on Information and Knowledge Management (CIKM)*, 2004.
143. Lita L.V., Carbonell J, “Instance-Based Question Answering: A Data Driven Approach,” *Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2004.
144. Liu Y, J Carbonell, J Klein-Seetharaman and V Gopalakrishnan, “Context Sensitive Vocabulary and its Application in Protein Secondary Structure Prediction,” *The International Conference on Information Retrieval (SIGIR)*, 2004.
145. Liu Y., Yan R., Jin R., and Carbonell J., “A Comparison Study of Kernels for Multi-label Text Classification Using Category Association,” *The Twenty-first International Conference on Machine Learning (ICML)*, 2004.
146. Probst K, L Levin, E Peterson, A Lavie, J Carbonell, “MT for Resource-Poor Languages Using Elicitation-Based Learning of Syntactic Transfer Rules,” *Machine Translation, Special Issue on Embedded MT*, 2004.
147. Monson C, Levin L, Vega R, Brown R, Font-Llitjos A, Lavie A, Carbonell J, Canulef E, Huisca R, “Data Collection

- and Analysis of Mapudungun Morphology for Spelling Correction,” *Proceedings of the Fourth International Conference on Language Resources and Evaluation (LREC)*, 2004.
148. Monson, C., A. Lavie, J. Carbonell and L. Levin, “Unsupervised Induction of Natural Language Morphology Inflection,” *Proceedings of Workshop on Current Themes in Computational Phonology and Morphology at the 42th Annual Meeting of the Association of Computational Linguistics*, Barcelona, Spain, July 2004.
  149. Monson C, Lavie A, Carbonell J, Levin L, “Unsupervised Induction of Natural Language Morphology Inflection Classes,” *Proceedings of the Workshop of the ACL Special Interest Group in Computational Phonology (SIGPHON)*, 2004.
  150. Lavie A, Vogel S, Peterson E, Probst K, Font-Llitjos A, Reynolds R, Carbonell J, Cohen R, “Experiments with a Hindi-to-English Transfer-based MT System under a Miserly Data Scenario,” *Transactions on Asian Language Information Processing, Special Issue on Rapid Deployment of Hindi-English Translation Systems*, 2004.
  151. Lavie A, Probst K, Peterson E, Vogel S, Levi L, Font-Llitjos A, Carbonell J, “A Trainable Transfer-based Machine Translation Approach for Languages with Limited Resources,” *Proceedings of the 9th Meeting of the European Association for Machine Translation (EAMT)*, 2004.
  152. Cavalli-Sforza, V., Carbonell, J.G., and Jansen P.J., “Developing Language Resources for Transnational Digital Government Systems: A Case Study,” *Proceedings of the Fourth International Conference on Language Resources and Evaluation (LREC)*, Lisbon, Portugal, May 2004, pp. 945-948.
  153. Gazen, C., Carbonell, J., Hayes, P., Jin, C., and Fink, E., “Hypothesis Formation and Tracking in ARGUS”, *Novel Intelligence from Massive Data (NIMD-2004)*, Orlando, FL, 2004.
  154. Su, S., Fortes, J., Kasad, T., Patil, M., Matsunaga, A., Tsugawa, M., Cavalli-Sforza, V., Carbonell, J., Jansen, P., Ward, W., Cole, R., Towsley, D., Chen, W., Anton, A.I., He, Q., McSweeney, C., deBrens, L., Ventura, J., Taveras, P., Connolly, R., Ortega, C., Pieres, B., Brooks, O., and Herrera, M., “A Prototype System for Transnational Information Sharing and Process Coordination,” *Proceedings of the National Conference on Digital Government Research*, Seattle, WA, May 2004.
  155. Cavalli-Sforza, V., Brown, R.D., Carbonell, J.G., Jansen, P.J., and Kim, J.D., “Challenges in Using an Example-Based MT System for A Transnational Digital Government Project,” *Proceedings of the Ninth Workshop of the European Association for Machine Translation (EAMT)*, Malta, 2004, pp. 33-42.
  156. Fink, E., Goldstein, A., Hayes, P., and Carbonell, J., “Search for Approximate Matches in Large Databases,” In *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, pages 1431-1435, 2004.
  157. Font Litjos, A., Carbonell, J. “The Translation Correction Tool : English-Spanish User Studies”, in the 4th International Conference on Language Resources (LREC), 2004.
  158. Carbonell J. Probst K., Peterson K, Monson C., Lavie, A. Brown R., and Levin L, “Automatic Rule Learning for Resource-Limited MT,” *Proceedings of the AMTA*, 2003.
  159. Yan Liu and Jaime Carbonell and RongJin, “A Pairwise Ensemble Approach for Accurate Genre Classification,” *Proceedings of the European Conference on Machine Learning (ICML)*, 2003.
  160. Jin R, Liu Y, Luo S, Carbonell J, Hauptmann A, “A New Boosting Algorithm Using an Input-Dependent Regularizer,” *Proceedings of The Twentieth International Conference on Machine Learning (ICML03)*, 2003.
  161. Lita L.V., Rogati M., Carbonell J., “Cross Lingual QA: A Modular Baseline,” *Cross-Language Evaluation Forum (CLEF)*, 2003.
  162. Cheng BY, Klein-Seetharaman J, Carbonell JG , “A Linguistic Approach to Identification of Motifs and Pharmaceutical Classification of GPCRs,” *Advancing Practice, Instruction and Innovation Through Informatics*, Pittsburgh, Pennsylvania, USA., 2003, (Best Scientific Session Award).
  163. Nyberg, E., T. Mitamura, J. Callan, J. Carbonell, R. Frederking, K. Collins-Thompson, L. Hiyakumoto, Y. Huang, C. Huttenhower, S. Judy, J. Ko, A. Kupsc, L. V. Lita, V. Pedro, D. Svoboda, and B. Van Durme, “The JAVELIN

164. Brown R, Hutchinson R, Bennett P, Carbonell J, Jansen P., “Reducing Boundary Friction Using Translation-Fragment Overlap,” *Proceedings of the Machine Translation Summit IX*, New Orleans, U.S.A, September 2003.
165. Hutchinson R, P. Bennett, J. Carbonell, P. Jansen, R. Brown, “Maximal Lattice Overlap in Example-Based Machine Translation,” Tech. report CMU-LTI-03-174, School of Computer Science, Carnegie Mellon University, 2003.
166. Liu Y., Carbonell J. Klein-Seetharaman J. and Gopalakrishnan V., “Prediction of Anti-parallel and Parallel Beta-sheets using Conditional Random Fields,” *Biological Language Conference (BLC)*, 2003.
167. Cavalli-Sforza V., Anton A.I., Carbonell J., Fortes J., Cole R., Herrera C., Krsul I., McSweeney C., Ortega C., Su S., Towsley D., Ventura J., Ward W., “Enabling Transnational Collection, Notification, and Sharing of Information,” *National Conference Digital Government Research*, Boston, MA, May 2003.
168. Cheng B. Y., Carbonell, J. G. and Klein-Seetharaman, J., “Document Classification of Protein Sequences,” *Proceedings of the 1st Biological Language Conference*, Pittsburgh, Pennsylvania, 2003.
169. Cheng, B. Y., Klein-Seetharaman, J. and Carbonell, J. G., “Identifying Important Words in the Language of Proteins,” *35th Central Regional Meeting of the American Chemical Society*, Pittsburgh, Pennsylvania, 2003.
170. Carbonell J, Probst K, Peterson K, Monson C, Lavie A, Brown R, Levin L, “Automatic Rule Learning for Resource-Limited MT,” *Proceedings of the Fifth Conference of the Association for Machine Translation in the Americas (AMTA)*, Tiburon, California, October 2002, pp. 1-10.
171. Probst K, Levin L, Peterson E, Lavie A, Carbonell J, “ MT for Minority Languages Using Elicitation-Based Learning of Syntactic Transfer Rules,” *Machine Translation*, Vol. 17, No. 4, 2002, pp. 245-270.
172. Yang Y, J. Zhang, J. Carbonell and C. Jin, “Topic-conditioned Novelty Detection,” *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, 2002, pp. 688-693.
173. Ganapathiraju, M., Weisser, D, Rosenfeld, R., Carbonell, J., Reddy, R. and Klein-Seetharaman, J “Comparative n-gram analysis of whole-genome sequences”. In *Proceedings of Human Language Technologies (HLT)*, San Diego, California, 2002.
174. Nyberg, E., T. Mitamura, J. Carbonell, J. Callan, K. Collins-Thompson, K. Czuba, M. Duggan, L. Hiyakumoto, N. Hu, Y. Huang, J. Ko, L. Lita, S. Murtagh, V. Pedro and D. Svoboda, “The JAVELIN Question-Answering System at TREC 2002,” *Proceedings of TREC 11*, November 2002.
175. Liu Y., Yang Y., and Carbonell, J., “Boosting to Correct the Inductive Bias for Text Classification,” *Proceedings of International Conference on Informaiton and Knowledge Management (CIKM)*, 2002, pp. 348-355.
176. Levin, L., R. Vega, J. Carbonell, R. Brown, A. Lavie, E. Canulef and C. Huenchullan, “Data Collection and Language Technologies for Mapudungun,” *Proceedings of International Workshop on Resources and Tools in Field Linguistics at the Third International Conference on Language Resources and Evaluation (LREC-2002)*, Las Palmas, Spain, June 2002.
177. Probst, K., R. Brown, J. Carbonell, A. Lavie, L. Levin, and E. Peterson. "Design and Implementation of Controlled Elicitation for Machine Translation of Low-density Languages". In *Proceedings of the MT-2010 Workshop at MT-Summit VIII*, Santiago de Compostela, Spain, September 2001.
178. Yang Y, Carbonell J, Brown R, Pierce T, Archibald B, Liu X, “Learning Approaches for Detecting and Tracking News Events,” *IEEE Transactions on Intelligent Systems*, Vol. 14, No. 4, 2000, pp. 32-43.
179. Goldstein, J., Mittal, V., Carbonell, J., and Kantrowitz, M., “Multi-Document Summarization by Sentence Extraction,” *ANLP/NAACL 2000 Conference*, April 2000, pp. 40-48.
180. Jade Goldstein, Vibhu Mittal, Jaime Carbonell, and Jamie Callan, “Creating and Evaluating Multi-Document Sentence Extract Summaries,” *Ninth International Conference on Information Knowledge Management (CIKM-00)*,

McLean, VA, November 2000.

181. Y. Yang and J.G. Carbonell and R. Brown and Thomas Pierce and Brian T. Archibald and Xin Liu, "Learning Approaches to Topic Detection and Tracking," *IEEE EXPERT, Special Issue on Applications of Intelligent Information Retrieval*, 1999.
182. Jaime G. Carbonell, Yiming Yang, John Lafferty, Ralf Brown, Tom Pierce, and Xin Liu., "CMU Approach to TDT: Segmentation, Detection, and Tracking," *Proceedings of the 1999 DARPA Broadcast News Conference*, 1999.
183. Ralf D. Brown, Thomas Pierce, Yiming Yang, and Jaime G. Carbonell, "Link Detection - Results and Analysis," *Topic Detection and Tracking Workshop*, 1999.
184. Jade Goldstein and Mark Kantrowitz and Vibhu O. Mittal and Jaime Carbonell, "Summarizing Text Documents: Sentence Selection and Evaluation Metrics," *Proceedings of SIGIR-99*, Berkeley, CA, August 1999.
185. Vibhu O. Mittal and Mark Kantrowitz and Jade Goldstein and Jaime Carbonell, "Selecting Text Spans for Document Summaries: Heuristics and Metrics," *Proceedings of AAAI-99*, Orlando, FL, July 1999.
186. Carbonell, J., and Goldstein, J., "MMR and Diversity-Based Reranking for Reordering Documents and Producing Summaries," *Proceedings of the 21st meeting of International ACM SIGIR Conference*, Melbourne, Australia, August 1998, pp. 335-336.
187. Y. Yang and J.G. Carbonell and R. Brown and R.E. Frederking, "Translingual Information Tetrieval: Learning from Bilingual Corpora," *Artificial Intelligence Journal*, 1998, pp. 323--345.
188. Y. Yang and T. Pierce and J. Carbonell, "A study on retrospective and on-line event detection," *Proceedings of the 21th Ann Int ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR'98)*, 1998, pp.
189. Carbonell J., Craven M., Fienberg S., Mitchell T. and Yang Y., "CONALD Report on the Workshop on Learning from Text and the Web". 1998.
190. Goldstein, J. and Carbonell, J., "The Use of MMR and Diversity-Based Reranking in Document Reranking and Summarization," *Proceedings of the 14th Twente Workshop on Language Technology in Multimedia Information Retrieval*, Enschede, the Netherlands, December 1998, pp. 152-166.
191. Allan, J., Carbonell, J.G., Doddington, G., Yamron, J. and Yang Y., Topic Detection and Tracking Pilot Study Final Report, Proceedings of the Broadcast News Transcription and Understanding Workshop (Sponsored by DARPA), Feb. 1998.
192. Carbonell. J. G., Yang, Y., Frederking, R. E., Brown, R., Geng, Y., and Lee, D., "Translingual Information Retrieval: A Comparative Evaluation," *Proceedings of IJCAI-97*, Nagoya, Japan, 1997, (Distinguished paper award).
193. Carbonell. J. G., Goldstein, J., Yibing, G., "Automated Query-Relevant Summarization and diversity-based reranking," *Proceedings of the IJCAI-97 workshop on AI in Digital Libraries*, Nagoya, Japan, 1997.
194. Nyberg, Mitamura and Carbonell, "The KANT Machine Translation System: From R&D to Initial Deployment," *LISA Workshop on Integrating Advanced Translation Technology*, June 1997.
195. Yang, Y., Brown, R., Frederking, R., Carbonell, J., Geng, Y., and Lee, D., "Bilingual Corpus Based Approaches to Translingual Information Retrieval," *Second Workshop on Multilinguality in Software Industry: The AI Contribution (MULSAIC'97)*, Nagoya, Japan, August, 1997.
196. Carbonell, J. G., "Digital Librarians – Beyond the Digital Book Stack," *IEEE Expert*, Vol. 11, June 1996, pp. 11-13.
197. Li, Nyberg and Carbonell, "Chinese Sentence Generation in a Knowledge-Based Machine Translation System," Tech. report, Carnegie Mellon University, 1996.
198. Veloso, M., Carbonell, J. G., Perez A. M, Borrajo, D., Fink, E. and Blythe, J., "Integrating Planning and Learning: The PRODIGY Architecture," *Journal of Experimental and Theoretical Artificial Intelligence*, 1995.

199. Perez, A. M. and Carbonell, J. G., "Control Knowledge to Improve Plan Quality," *Proceedings of the Second International Conference on AI Planning Systems, AIPS-94*, AAAI Press, Chicago, IL, June 1994, pp. 323-328.
200. Wang, X. and Carbonell, J. G., "Learning by Observation and Practice: Towards Real Applications of Planning systems," *AAAI-94 Fall Symposium Series: Planning and Learning: On to Real Applications*, New Orleans, Louisiana, 1994.
201. Veloso, M. M. and Carbonell, J. G., "Derivational Analogy in PRODIGY: Automating Case Acquisition, Storage and Utilization," *Machine Learning*, Vol. 10, 1993, pp. 249-278.
202. Mitamura, Nyberg and Carbonell, "Automated Corpus Analysis and the Acquisition of Large, Multi-Lingual Knowledge Bases for MT," *Proceedings of the Theoretical and Methodological Issues in Machine Translation Conference*, 1993.
203. Carbonell, Mitamura and Nyberg, "The KANT Perspective: A Critique of Pure Transfer (and Pure Interlingua, Pure Statistics, ...)," *Proceedings of the Theoretical and Methodological Issues in Machine Translation Conference*, 1999.
204. Mitamura, Nyberg and Carbonell, "An Efficient Interlingua Translation System for Multi-lingual Document Production," *Proceedings of the Third Machine Translation Summit*, 1991.
205. Nirenburg, S. Carbonell, J. G., Tomita, M., and Goodman, K., *Knowledge-Based Machine Translation*, Morgan Kaufmann Inc, San Mateo, CA, 1991.
206. Carbonell, J. G., Minton, S. N., Knoblock, C. A., Etzioni, O., Veloso, M. M., Joseph, R., and Gil, Y., *PRODIGY: An Integrated Architecture for Planning and Learning*, Morgan Kaufmann Inc, San Mateo, CA, 1990, (In Preparation).
207. Manuela M. Veloso and Jaime G. Carbonell, "Variable-Precision Case Retrieval in Analogical Problem Solving," *Proceedings of the 1991 {DARPA Workshop on Case-Based Reasoning,}* Morgan Kaufmann, May 1991.
208. Manuela M. Veloso and Jaime G. Carbonell, "Learning by Analogical Replay in Prodigy: First Results," *Proceedings of the European Working Session on Learning*, Springer-Verlag, March 1991.
209. Shell, P. and Carbonell, J. C., "Empirical and Analytical Performance of Iterative Operators," *Proceedings of the International Machine Learning Workshop*, 1991.
210. Hickman, A. Kennedy, Shell, P. and Carbonell, J. G., "Learning by Internal Analogy during Problem Solving," *Proceedings of the Eighth International Conference on Machine Learning*, Birnbaum, L. and Collins, G., ed., Morgan Kaufmann, Evanston, IL, 1991.
211. Carbonell, J. G., (Ed), *Machine Learning: Paradigms and Methods*, MIT Press, Cambridge, MA, 1990.
212. Carbonell, J. G., Knoblock, C. A. and Minton, S. N., "Prodigy: An Integrated Architecture for Planning and Learning," in *Architectures for Intelligence*, K. VanLehn, ed., Lawrence Erlbaum, Hillsdale, NJ, 1990, Also Technical Report CMU-CS-89-189.
213. Carbonell, J. G., Gil, Y., Joseph, R., Knoblock, C. A., Minton, S. N. and Veloso, M. M., "Designing an Integrated Architecture: The PRODIGY View," *Proceedings of the Twelfth Annual Conference of the Cognitive Science Society*, MIT: Cambridge, MA, 1990.
214. Veloso, M. M. and Carbonell, J. G., "Integrating analogy into a general problem-solving architecture," in *Intelligent Systems*, M. Zemankova and Z. Ras, ed., Ellis Horwood Inc, 1990.
215. Carbonell, J. G. and Gil, Y., "Learning by Experimentation: The Operator Refinement Method," in *Machine Learning: An Artificial Intelligence Approach, Volume III*, R. S. Michalski and Y. Kodratoff, eds., Morgan Kaufmann, San Mateo, CA, 1990.
216. Veloso, M. M., Carbonell, J. G. and Knoblock, C. A., "Nonlinear Planning in Complex Domains using a Casual-Commitment Approach," *Preprints of the AAAI-90 Workshop on Planning in Complex Domains*, MIT: Cambridge, MA, 1990.

217. Hickman, A. K., Shell, P., and Carbonell, J. G., "Internal Analogy: Reducing Search During Problem Solving," in *Computer Science Research Review*, N. Habermann, ed., Carnegie Mellon U., 1990.
218. Manuela M. Veloso, M. Alicia Perez and Jaime G. Carbonell, "Nonlinear Planning with Parallel Resource Allocation," *Proceedings of the DARPA Workshop on Innovative Approaches to Planning, Scheduling, and Control*, November 1990.
219. Carbonell, J. G., "Paradigms for Machine Learning," *Artificial Intelligence*, Vol. 40, 1989, pp. 63-118.
220. Minton, S. N., Carbonell, J. G., Knoblock, C. A., Kuokka, D. R., Etzioni, O., and Gil, Y., "Explanation-Based Learning: a Problem Solving Perspective," *Artificial Intelligence*, Vol. 40, 1989, pp. 63-118, (Also appeared in *Machine Learning: Paradigms and Methods*, MIT Press, 1990).
221. Lehman, J. F., and Carbonell, J. G., "Learning the User's Language, A Step Towards Automated Creation of User Models," in *User Modeling in Dialog Systems*, W. Wahlster and A. Kobsa, eds., Springer-Verlag, 1989.
222. Shell, P. and Carbonell, J. G., "Towards a General Framework for Composing Disjunctive and Iterative Macro-operators," *Proceedings of the International Joint Conference on Artificial Intelligence*, Detroit, 1989.
223. Veloso, M. M. and Carbonell, J. G., "Learning Analogies by Analogy - The Closed Loop of Memory Organization and Problem Solving," *Proceedings of the Second Workshop on Case-Based Reasoning*, Morgan Kaufmann, San Mateo, CA, May 1989.
224. Carbonell, J. G., Knoblock, C. A. and Minton, S. N., "Prodigy: An Integrated Architecture for Planning and Learning," Tech. report CMU-CS-89-189, School of Computer Science, Carnegie Mellon University, Pittsburgh, PA, 1989.
225. Carbonell, J. G. and Brown, R. D., "Anaphora Resolution: A Multi-Strategy Approach," *Proceedings of the Twelfth International Conference on Computational Linguistics*, August 1988, pp. 96-101.
226. Carbonell, J. G. and Hayes, P. H., "Robust Parsing Using Multiple Construction-Specific Strategies," in *Natural Language Parsing Systems*, L. Bolc, ed., Springer-Verlag Publishers, 1988.
227. Carbonell, J. G. and Tomita, M., "Multilingual Machine Translation, A Knowledge-Based Approach," in *Defense Applications of Artificial Intelligence*, Hopple, G. W. and Andriole, S. J., eds., Lexington Books, D. C. Heath & co., 1988.
228. Carbonell, J. G. and Veloso, M. M., "Integrating Derivational Analogy into a General Problem Solving Architecture," *Proceedings of the First Workshop on Case-Based Reasoning*, Morgan Kaufmann, San Mateo, CA, May 1988.
229. Minton, S. N., Knoblock, C. A. Kuokka, D. R. Gil, Y. and Carbonell, J. G., "PRODIGY 1.0: Manual and Tutorial," Tech. report, Computer Science Department, Carnegie Mellon University, Pittsburgh, PA, 1988.
230. Carbonell, J. G., and Tomita, M., "Knowledge-Based Machine Translation, The CMU Approach," in *Machine Translation: Theoretical and Methodological Issues*, Nirenburg, S., ed., Cambridge, U. Press, 1987.
231. Carbonell, J. G. and Hayes, P. J., "Natural Language Understanding," in *Encyclopedia of Artificial Intelligence*, Shapiro, S. C., ed., Wiley & Sons, New York, NY, 1987, pp. 660-677.
232. Langley, P. W. and Carbonell, J. G., "Machine Learning," in *Encyclopedia of Artificial Intelligence*, Shapiro, S. C., ed., Wiley & Sons, New York, NY, 1987, pp. 464-488.
233. Monarch, I. and Carbonell, J. G., "CoalSORT: A Knowledge-Based Interface," *IEEE Expert*, Vol. 2, No. 1, 1987, pp. 39-53.
234. Nirenburg, S. and Carbonell, J. G., "Integrating Discourse Pragmatics and Propositional Knowledge for Multilingual Natural Language Processing," *Computers and Translation*, Vol. 2, 1987, pp. 105-116.
235. Tomita, M. and Carbonell, J. G., "The Universal Parser Architecture for Knowledge-Based Machine Translation,"



236. Minton, S. N. and Carbonell, J. G., "Strategies for Learning Search Control Rules: An Explanation-Based Approach," *Proceedings of IJCAI-87, Milan, Italy, 1987.*
237. Langley, P. and Carbonell, J. G., "Language Acquisition and Machine Learning," in *Mechanisms for Language Acquisition*, MacWhinney B., ed., Lawrence Erlbaum Associates, 1987, pp. 115-155.
238. Mauldin, M., Carbonell, J. G. and Thomason, R., "Beyond the Keyword Barrier: Knowledge-Based Information Retrieval," *Proceedings of the 29th Annual NFAIS conference*, Elsevier Press, 1987.
239. Carbonell, J. G. and Gil, Y., "Learning Domain Knowledge by Experimentation," *Proceedings of the fourth Machine Learning Workshop*, Irvine, CA, 1987.
240. Minton, S. N., Carbonell, J. G., Knoblock, C. A., Kuokka, D. R., Etzioni, O. and Gil, Y., "Acquiring Effective Search Control Rules: Explanation-Based Learning in the PRODIGY System," *Proceedings of the fourth Machine Learning Workshop*, Irvine, CA, 1987.
241. Tomita, M. and Carbonell, J. G., "The Universal Parser Architecture for Knowledge-Based Machine Translation," in *Computer Science Research Review*, A. N. Habermann, ed., Carnegie Mellon University, Pittsburgh, PA, 1987.
242. Carbonell, J. G., "Derivational Analogy: A Theory of Reconstructive Problem Solving and Expertise Acquisition," in *Machine Learning, An Artificial Intelligence Approach, Volume II*, Michalski, R. S., Carbonell, J. G. and Mitchell, T. M., eds., Morgan Kaufmann, 1986.
243. Michalski, R. S., Carbonell, J. G., and Mitchell, T. M. (Eds), *Machine Learning, An Artificial Intelligence Approach, Volume II*, Morgan Kaufmann, Los Altos, CA, 1986.
244. Carbonell, J. G. and Hood, G., "The World Modelers Project: Learning in a Reactive Environment," in *Machine Learning: A Guide to Current Research*, Mitchell, T. M., Carbonell, J. G. and Michalski, R. S., eds., Kluwer Academic Press, 1986, pp. 29-34.
245. Mitchell, T. M., Carbonell, J. G. and Michalski, R. S., editors, *Machine Learning: A Guide to Current Research*, Kluwer Academic Press, 1986.
246. Carbonell, J. G., "The SMOKEY Project: An Intelligent Sensor-Based Fireman's Assistant," in *Theory and Applications of Expert Systems in Emergency Management Operations*, Gass, S. L. and Chapman, R. E., eds., U.S. Government Printing Office, 1986.
247. Larkin, J., Reif, F. and Carbonell, J. G., "FERMI: A Flexible Expert Reasoner with Multi-Domain Inference," *Cognitive Science*, Vol. 9, 1986.
248. Carbonell, J. G., "Requirements for Robust Natural Language Interfaces: The XCALIBUR and LanguageCraft Experiences," *Proceedings of COLING-86*, Munich, Germany, 1986.
249. Carbonell, J. G., and Fain, J. E., "Modeling the Natural Language Interface User: Task Knowledge and Linguistic Usage Patterns," *Preprints of the first user modeling workshop*, Wahlster, W. and Kobsa, A., eds., Maria Lach, West Germany, 1986.
250. Minton, S., Carbonell, J. G., Knoblock, C., Kuokka, D. and Nordin, H., "Improving the Effectiveness of Explanation-Based Learning," Tech. report, Carnegie-Mellon University, Computer Science Department, 1986.
251. Cheng, P. W. and Carbonell, J. G., "Inducing Iterative Rules from Experience: The FERMI Experiment," *Proceedings of AAAI-86*, 1986.
252. Carbonell, J. G., "Metaphors and Physical Envisionment," *Preprints of the Analogy and Similarity Workshop*, Monticello, IL, 1986.
253. Tomita, M. and Carbonell, J. G., "Another Stride Towards Knowledge-Based Machine Translation: An Entity Oriented Approach," *Proceedings of COLING-86*, 1986.

254. Hayes, P. J., Hauptmann, A., Carbonell, J. G., and Tomita, M., "Parsing Spoken Language: a Semantic Caseframe Approach," *Proceedings of COLING-86*, 1986.
255. Minton, S. N., Carbonell, J. G., Knoblock, K. A., Kuokka, D. R., and Nordin, H., "Improving the Effectiveness of Explanation-Based Learning," *Proceedings of the Workshop on Knowledge Compilation*, Seattle, WA, 1986.
256. Carbonell, J. G., Evans, D. A., Scott, D. S. and Thomason, R. H., "On the Design of Biomedical Knowledge Bases," *Proceedings of the Fifth Conference on Medical Informatics*, Salamon, R., Blum, B. and Jorgensen, M., eds., Elsevier Science Pub., Washington, DC, 1986, pp. 37-41.
257. Carbonell, J. G. and Thomason, R. H., "Parsing in Biomedical Indexing and Retrieval," *Proceedings of AAMSI-86*, 1986.
258. Shell, P. and Carbonell, J. G., "The FRuleKit Reference Manual", CMU Computer Science Department internal paper. 1985.
259. Carbonell, J. G. and Minton, S., "Metaphor and Commonsense Reasoning," in *Formal Theories of the Commonsense World*, J. Hobbs, ed., Ablex Publishing Co., 1985, (also CMU Computer Science Tech report).
260. Carbonell, J. G., "Robust Man-Machine Communication, User Modeling and Natural Language Interface Design," in *Applications in Artificial Intelligence*, S. Andriole, ed., Petrocelli Books Inc., 1985.
261. Carbonell, J. G., Boggs, W. M., Mauldin, M. L. and Anick, P. G., "The XCALIBUR Project, A Natural Language Interface to Expert Systems and Data Bases," in *Applications in Artificial Intelligence*, S. Andriole, ed., Petrocelli Books Inc., 1985.
262. Carbonell, J. G., "AI Languages for Problem Solving," in *The Role of Language in Problem Solving-I*, Jernigan, R., Hamill, B. W. and Weintraub, D. M., eds., North-Holland, 1985, pp. 82-103.
263. Carbonell, J. G., "New Approaches to Machine Translation," *Proceedings of the conference on Theoretical and Methodological Issues in Machine Translation of Natural Languages*, Hamilton, NY, 1985.
264. Fain, J., Carbonell, J. G., Hayes, P. J. and Minton, S. N., "MULTIPAR: a Robust Entity-Oriented Parser," *Proceedings of Seventh the Cognitive Science Society Conference*, Irvine, CA, 1985, pp. 110-119.
265. Larkin, J., Reif, F. and Carbonell, J. G., "FERMI: A Flexible Expert Reasoner with Multi-Domain Inference," Tech. report, CMU, Psychology dept., 1985.
266. Boggs, W. M. and Carbonell, J. G., Kee, M. and Monarch, I., "The DYPAR-I Tutorial and Reference Manual," Tech. report, Carnegie-Mellon University, Computer Science Department, 1985.
267. Carbonell, J. G. and Joseph, R., "The FrameKit<sup>+</sup> Reference Manual", CMU Computer Science Department internal paper. 1984.
268. Carbonell, J. G. and Schustack, M. W., "Cognitive Science at 7: A Wolf at the Door for Behaviorism?," *Behavioral and Brain Sciences*, Vol. 7, 1984, Commentary on B. F. Skinner's 'Behaviorism at 50'.
269. Langley, P. and Carbonell, J. G., "Approaches to Machine Learning," *Journal of the American Society for Information Science*, 1984.
270. Carbonell, J. G. and Hayes, P. J., "Coping with Extragrammaticality," *Proceedings of COLING-84*, Stanford, CA., June 1984.
271. Carbonell, J. G. and Frederking, R. E., "Natural Language Interfaces to Knowledge-Based Systems", Chapter for published manuscript: *The Factory of the Future: A CMU Perspective*, Edited by Fox, M. S., McDermott, J., and Reddy, D. R.
272. Carbonell, J. G., "Is There Natural Language after Data Bases?," *Proceedings of COLING-84*, Stanford, CA, June 1984.

273. Carbonell, J. G. and Hayes, P. J., "Recovery Strategies for Parsing Extragrammatical Language," *American Journal of Computational Linguistics*, Vol. 9, No. 3-4, 1983, pp. 123-146.
274. Carbonell, J. G., "Derivational Analogy in Problem Solving and Knowledge Acquisition," *Proceedings of the International Machine Learning Workshop*, Allerton Park, IL, 1983, pp. 12-18.
275. Michalski, R. S., Carbonell, J. G., and Mitchell, T. M. (Eds), *Machine Learning, An Artificial Intelligence Approach*, Tioga Press, Palo Alto, CA, 1983.
276. Carbonell, J. G., "Learning by Analogy: Formulating and Generalizing Plans from Past Experience," in *Machine Learning, An Artificial Intelligence Approach*, R. S. Michalski, J. G. Carbonell and T. M. Mitchell, eds., Tioga Press, Palo Alto, CA, 1983.
277. Carbonell, J. G., Michalski, R. S. and Mitchell, T. M., "An Overview of Machine Learning," in *Machine Learning, An Artificial Intelligence Approach*, R. S. Michalski, J. G. Carbonell and T. M. Mitchell, eds., Tioga Press, Palo Alto, CA, 1983.
278. Hayes, P. J. and Carbonell, J. G., "A Natural Language Processing Tutorial," Tech. report, Carnegie-Mellon University, Computer Science Department, 1983.
279. Carbonell, J. G., Michalski, R. S. and Mitchell, T. M., "Machine Learning, Part I: A Historical and Methodological Analysis," *Artificial Intelligence Magazine*, 1983, Reprinted in *Readings from AI Magazine 1980-1985*.
280. Carbonell, J. G., "Derivational Analogy and Its Role in Problem Solving," *Proceedings of the third meeting of the American Association for Artificial Intelligence*, 1983.
281. Carbonell, J. G., Boggs, W. M., Mauldin, M. L. and Anick, P. G., "The XCALIBUR Project, A Natural Language Interface to Expert Systems," *Proceedings of the 8th International Joint Conference on Artificial Intelligence*, 1983.
282. Carbonell, J. G., Larkin, J. H. and Reif, F., "Towards a General Scientific Reasoning Engine," Tech. report, Carnegie-Mellon University, Computer Science Department, 1983, CIP #445.
283. Hayes, P. J. and Carbonell, J. G., "A Framework for Processing Corrections in Task-Oriented Dialogs," *Proceedings of the Eighth International Joint Conference on Artificial Intelligence*, 1983.
284. Carbonell, J. G., "Discourse Pragmatics in Task-Oriented Natural Language Interfaces," *Proceedings of the 21st annual meeting of the Association for Computational Linguistics*, 1983.
285. Carbonell, J. G., "User Modeling and Natural Language Interface Design," *Proceedings of the ACM workshop on Software Ergonomics*, Nuremberg, West Germany, 1983.
286. Carbonell, J. G., "The Role of User Modeling in Natural Language Interface Design," Tech. report, Carnegie-Mellon University, Computer Science Department, 1983, Presented at the 1983 AAAS symposium on AI.
287. Carbonell, J. G., Boggs, W. M., Mauldin, M. L. and Anick, P. G., "XCALIBUR Progress Report #1: First Steps Towards an Integrated Natural Language Interface," Tech. report, Carnegie-Mellon University, CS Dept., 1983.
288. Carbonell, J. G. and Hayes, P. J., "Tutorial Notes on Natural Language Processing", IJCAI-83 Tutorial program proceedings.
289. Carbonell, J. G., "Metaphor: An Inescapable Phenomenon in Natural Language Comprehension," in *Strategies for Natural Language Processing*, W. Lehnert and M. Ringle, eds., New Jersey: Erlbaum, 1982, pp. 415-434.
290. Carbonell, J. G., "Experiential Learning in Analogical Problem Solving," *Proceedings of the Second Meeting of the American Association for Artificial Intelligence*, Pittsburgh, PA, 1982.
291. Carbonell, J. G., "Where do Goals Come From?," *Proceedings of the Fourth Annual Meeting of the Cognitive Science Society*, Ann Arbor, MI, 1982.

292. Carbonell, J. G., "Towards a Computational Model of Metaphor in Common Sense Reasoning," *Proceedings of the Fourth Annual Meeting of the Cognitive Science Society*, Ann Arbor, MI, 1982.
293. Carbonell, J. G., "Meta-Language Utterances in Purposive Discourse," Tech. report, Carnegie-Mellon University, Computer Science Department, 1982.
294. Carbonell, J. G., "Natural Language Interfaces to Software Systems," *Proceedings of the 1982 Office Automation Conference*, San Francisco, CA, 1982.
295. Chubin, D. E., Roessner, J. D., Carbonell, J. G., Kalow, S. and Rossini, F. A., "Trends in Computers and Communication: The Office of the future", National Science Foundation series on the five-year outlook on science and technology.
296. Carbonell, J. G., "Interpreting Meta-Language Utterances," *Preprints of the workshop: L'Analyse du Language Naturel par L'Ordinateur*, Cadarache, France, 1982.
297. Carbonell, J. G., "Learning by Analogy," Tech. report, Carnegie-Mellon University, Computer Science Department, 1982.
298. Hood, G. and Carbonell, J. G., "The World Modelers Project: Constructing a Simulated Environment to Aid AI Research," *Proceedings of the Thirteenth Annual Conference on Modeling and Simulation*, Pittsburgh, PA, 1982.
299. Carbonell, J. G., *Subjective Understanding: Computer Models of Belief Systems*, Ann Arbor, MI: UMI research press, 1981.
300. Carbonell, J. G., "Counterplanning: A Strategy-Based Model of Adversary Planning in Real-World Situations," *Artificial Intelligence*, Vol. 16, 1981, pp. 295-329.
301. Carbonell, J. G., Cullingford, R. E. and Gershman A. G., "Steps Towards Knowledge-Based Machine Translation," *IEEE Trans. PAMI*, Vol. PAMI-3, No. 4, July 1981.
302. Carbonell, J. G., "POLITICS: An Experiment in Subjective Understanding and Integrated Reasoning," in *Inside Computer Understanding: Five Programs Plus Miniatures*, R. C. Schank and C. K. Riesbeck, eds., New Jersey: Erlbaum, 1981.
303. Carbonell, J. G., "Issues in Computer Modeling of Cognitive Phenomena: An AI Perspective (Commentary on K. M. Colby's 'Modeling a Paranoid Mind')," *The Behavioral and Brain Sciences*, Vol. 4, No. 4, December 1981.
304. Carbonell, J. G. and Hayes, P. J., "Dynamic Strategy Selection in Flexible Parsing," *Proceedings of the 19th Meeting of the Association for Computational Linguistics*, 1981.
305. Carbonell, J. G., "A Computational Model of Problem Solving by Analogy," *Proceedings of the Seventh International Joint Conference on Artificial Intelligence*, August 1981, pp. 147-152.
306. Hayes, P. J., and Carbonell, J. G., "Multi-Strategy Construction-Specific Parsing for Flexible Data Base Query and Update," *Proceedings of the Seventh International Joint Conference on Artificial Intelligence*, August 1981, pp. 432-439.
307. Carbonell, J. G., "Invariance Hierarchies in Metaphor Interpretation," *Proceedings of the Third Meeting of the Cognitive Science Society*, August 1981, pp. 292-295.
308. Mitchell, T. M., Carbonell, J. G. and Michalski, R. S., "Special Issue on Machine Learning," *SIGART Newsletter*, No. 76, April 1981.
309. Carbonell, J. G., "Metaphor Comprehension," Tech. report CMU-CS-81-115, Carnegie-Mellon University, Computer Science Department, May 1981.
310. Hendrix, G. G. and Carbonell, J. G., "A Tutorial on Natural Language Processing," *Proceedings of the 1981 Annual Meeting of the ACM*, November 1981.

311. Hayes, P. J. and Carbonell, J. G., "Multi-Strategy Parsing and its Role in Robust Man-Machine Communication," Tech. report CMU-CS-81-118, Carnegie-Mellon University, Computer Science Department, May 1981.
312. Carbonell, J. G., "Towards a Robust, Task-Oriented Natural Language Interface," *Workshop/Symposium on Human Computer Interaction*, A. N. Badler, ed., March 1981.
313. Carbonell, J. G., "Towards a Process Model of Human Personality Traits," *Artificial Intelligence*, Vol. 15, No. 1,2, November 1980, pp. 49-74.
314. Carbonell, J. G., "Metaphor - A Key to Extensible Semantic Analysis," *Proceedings of the 18th Meeting of the Association for Computational Linguistics*, 1980.
315. Carbonell, J. G., "Default Reasoning and Inheritance Mechanisms on Type Hierarchies," *SIGART, SIGPLAN, SIGMOD Joint volume on Data Abstraction*, 1980.
316. Carbonell, J. G., "Towards Self-Extending Models, An AI Perspective," *Preprints of the Workshop on Data Abstraction, Data Bases and Conceptual Modeling*, June 1980.
317. Carbonell, J. G., "Δ-MIN: A Search-Control Method for Information-Gathering Problems," *Proceedings of the First AAAI Conference*, August 1980.
318. Carbonell, J. G., "The POLITICS Project: Subjective Reasoning in a Multi-Actor Planning Domain," in *Computer Science Research Review*, Carnegie-Mellon University, 1979-1980.
319. Carbonell, J. G., "Learning and Problem Solving by Analogy," *Preprints of the CMU Machine Learning Workshop-Symposium*, July 1980.
320. Schank R. C. and Carbonell, J. G., "Re: The Gettysburgh Address, Representing Social and Political Acts," in *Associative Networks*, Findler, N., ed., Academic Press, 1979, Also Yale U. Comp. Sci. Report #127, 1978.
321. Carbonell, J. G., "The Counterplanning Process: A Model of Decision-Making in Adverse Situations," *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, 1979, pp. 124-130, Extended paper: Carnegie-Mellon Comp. Sci. Tech. Report.
322. Carbonell, J. G., "Computer Models of Human Personality Traits," *Proceedings of the Sixth International Joint Conference on Artificial Intelligence*, 1979, pp. 121-123, Extended paper: Carnegie-Mellon Comp. Sci. Tech. Report.
323. Carbonell, J. G., "Counterplanning Strategies: Computer Models of Human Reasoning in Conflict Situations," *Proceedings of the First International Policy Analysis and Information Science Conference*, 1979, pp. 387-394.
324. Carbonell, J. G., *Subjective Understanding: Computer Models of Belief Systems.*, PhD dissertation, Yale University, Jan. 1979, Also Yale U. Comp. Sci. Report #150.
325. Carbonell, J. G., "Towards a Self-Extending Parser," *Proceedings of the 17th Meeting of the Association for Computational Linguistics*, 1979, pp. 3-7.
326. Carbonell, J. G., "POLITICS: Automated Ideological Reasoning," *Cognitive Science*, Vo. 2, No. 1, 1978, pp. 27-51.
327. Carbonell, J. G. and Schank, R. C., "On Artificial Intelligence and Attempts to Disprove its Existence," *Information Systems*, Vol. 3, No. 3, 1978, pp. 227-230.
328. Carbonell, J. G., "Intentionality and Human Conversation," *Proceedings of the Second Conference on Theoretical Issues in Natural Lang. Proc.*, 1978, pp. 141-148.
329. Carbonell, J. G., Cullingford, R. C. and Gershman, A. G., "Towards Knowledge-Based Machine Translation," *Proceedings of the Seventh International Joint Conference on Computational Linguistics*, 1978.
330. Schank, R. C., Wilensky, R., Carbonell, J. G., Kolodner, J. L. and Hendler, J. A., "Representing Attitudes: Some Primitive States," Tech. report 143, Computer Science Department, Yale University, 1978.

331. Carbonell, J. G., Cullingford, R. and Gershman, A. V., "Knowledge-Based Machine Translation," Tech. report 146, Computer Science Dept., Yale University, 1978.
332. Carbonell, J. G., "Ideological Belief Simulation," PhD Dissertation and Tech. report 111, Yale University, Comp. Sci. Dept., 1977.
333. Carbonell, J. G., "Discrete Channel Apodization Methods for the Analysis of High-Energy X-Ray Data", S.B. Thesis, M.I.T. Physics Dept. 1975.
334. Collins, A. M., Gould, L., Passafiume, J. and Carbonell, J. G., "Improving Interactive Capabilities in Computer-Assisted Instruction," Tech. report 2631, Bolt Beranek and Newman, August 1973.