

The announcement of Bill Woods as the recipient of the 2010 ACL Lifetime Achievement Award

The announcement of Bill Woods as the recipient of the 2010 ACL Lifetime Achievement Award at the ACL Annual meeting in Uppsala, Sweden, delivered by Ido Dagan, the President of the ACL

One perspective through which Bill Woods looks at himself is as a "problem solver". But this definition is not specific enough, because there are two ways to solve problems: one is to figure out what the solution for the problem is, while the other is to actually build something that solves it. Bill is definitely an outstanding representative of the latter approach.

Ever since his father taught him to use basic hand tools, he has been building things. Accordingly, unlike most recipients of this award, Bill spent most of his career in industrial research. Here is a partial list of his pioneering work, taken from various points during his career:

- In a summer job, he built a sine and cosine routine that was accurate to the 12th decimal place, for astronomers who really cared about accuracy.
- For the NASA Manned Spacecraft Center, he built a system that answered natural English questions about the Apollo 11 moon rocks.
- With his colleagues at BBN he built a system to understand speech in fluent natural language, for managing trips and travel budgets.
- At Sun Microsystems Laboratories, he built a search engine that finds the exact place in the document where you're likely to find the information, based on models of word meaning. He carried this project all the way from a research idea to a deployed system, which was shipped in several Sun products and runs internally at Sun on a daily basis.
- At his current position at ITA Software, he has been working in the Needle Project, extracting data from the deep web using learning techniques. Bill proposed and built the first festivals and events database, that collects things you might want to do while traveling, as well as things that you might want to travel to do.

But a distinguished characteristic of Bill's research is that he was also developing powerful theories and formalisms as a solid scientific basis for his work. This may have been inspired by his mathematical education, receiving a B.A. in Mathematics and Physics from Ohio Wesleyan University and a Masters and Ph.D. in Applied Mathematics from Harvard University.

Bill's 1968 PhD thesis was one of the first devoted to natural language access to a large database, and included a number of computational semantic innovations.

Later on, Bill's distinctive contribution to the Lunar Project included the Augmented Transition Network (ATN) parser, which was the first properly formalized hand-built parser that could produce Chomsky-style deep structure analyses for a large, fluent subset of natural English. The ATN formalism incorporated a number of novel techniques that have been subsequently built upon (and repeatedly reinvented), and was accompanied by a pioneering "procedural semantics" mechanism. His seminal paper in CACM in 1970, "Transition Network Grammars for Natural Language Analysis" has more than 1200 citations.

Another seminal innovation in which Bill was involved was the KL-One Knowledge Representation formalism, which was developed from Ron Brachman's Ph.D. thesis under Bill's supervision. KL-One was the first attempt at a properly formalized knowledge representation for NLP, including a number of innovations like early matching and unification algorithms. It was partly in response to Bill's important analysis of hitherto ad hoc semantic-net representations, presented in Bill's 1975 seminal paper "What's in a Link?".

His Information Retrieval research at Sun was based on the Conceptual Indexing model that he developed based on his semantic knowledge representation insights. This research was reported and evaluated in a widely cited Technical Report in 1997 and later in a paper titled "Linguistic Knowledge Can Improve Information Retrieval" at the Applied Natural Language Processing Conference in 2000.

Along the years, Bill Woods held various Professorship positions at Harvard University.

Obviously, Bill was not chosen as the award recipient because he did so many things, but rather because both his theoretical and applied contributions have been so influential. The depth and formal clarity of the ATN work revived interest in automata-theoretic characterizations of natural language, and pointed the way to expressively-constrained yet linguistically adequate formalisms like TAG, CCG, LFG and HPSG. These constrained grammar formalisms allowed in turn the reunification of modern grammar-based and probabilistic-based parsing. In a similar spirit, KL-One was the first of many Description Logic formalisms for Natural Language Understanding. The ideas behind conceptual indexing are being applied to Information Retrieval tasks by other groups, and tie to recent popular research on paraphrasing.

The ACL is not the first to recognize Bill Woods' contributions. A partial list of his honors and distinguished roles include:

- Fulbright Fellowship, 1978, University of Sussex.
- National Research Council Panel on Applied Mathematics Research Alternatives for the Navy, 1982-1985.
- National Research Council Committee on Computerized Speech Recognition Technologies, 1983-1984
- Board of Directors of the Computer Research Association, 1999-2002
- Executive council of the American Association for Artificial Intelligence - AAI, 1988-1990, and a AAI Fellow, 1990.

- Fellow of the American Association for the Advancement of Science, 1992.
- Finally, Bill was the President of the Association for Computational Linguistics (ACL), in 1974.

It is inspiring that such encompassing breadth and profound depth are embodied in a single person. The ACL thanks Bill Woods for his lifelong contribution to computational language processing, by adding the ACL Lifetime Achievement Award to his list of honors.