

# In Memoriam Alberto Oscar Mendelzon

July 28, 1951 - June 16, 2005



Alberto Oscar Mendelzon passed away on June 16, 2005 after a two-year battle with cancer. This tribute to Alberto and his achievements is written in recognition of his great intellect and his generous friendship. Both have influenced and inspired many in the database research community.

Alberto was one of the pioneers who helped to lay the foundations of relational databases. His early work on database dependencies has been influential in both the theory and practice of data management. He has made fundamental contributions in the areas of graphical query languages, knowledge-base systems, and on-line analytic processing. His work has provided the foundation for languages used to query the structure of the web. More than all of this, he was a man admired for his humor, his modesty, and his devotion to his students, his family, and his friends.

Alberto Mendelzon, professor of computer science at the University of Toronto, was born in Buenos Aires, Argentina. His academic journey began in Argentina and he maintained, throughout his life, close ties to his home country and home continent. He graduated from the University of Buenos Aires in 1973 before studying at Princeton as a Fulbright Scholar. At Princeton, he received a M.S.E. degree in 1977, a M.A. degree in 1978, and a Ph.D. degree in 1979. He was a post-doctoral fellow at IBM's T.J. Watson Research Center for a year before joining the University of Toronto in 1980.

Alberto established some of the earliest results on using the relational data model. Together with his thesis advisor, Jeff Ullman, and fellow Princeton students, including David Maier and Yeshoshua Sagiv, Alberto co-authored a number of influential papers that laid out the fundamental is-

ssues and approaches for relational databases. Alberto's 1979 Princeton Ph.D. on "Data Dependencies in the Relational Model" provided a foundation for understanding and reasoning about the consistency of data. The famous MMS79 paper (Maier, Mendelzon and Sagiv, TODS 1979), which was selected as one of the best papers of SIGMOD 1979 and invited for TODS publication, introduced the chase, a method for testing implication of data dependencies. This work has been highly influential: it is used, directly or indirectly, on an everyday basis by people who design databases, and it is used in commercial systems to reason about the consistency and correctness of a data design. New applications of the chase in meta-data management and data exchange are still being discovered.

In the 1980's, Alberto began an important line of work on graphical query languages. His work has been called *pre-scient* as it began before the World Wide Web, and nonetheless established many of the scientific principles required for designing languages to query the Web. His work in this area led to a series of well-known projects (Hy+, WebSQL, WebOQL, ToX). His work on WebSQL has been hailed as ground breaking. The highly cited MMM97 paper (Mendelzon, Mihaila and Milo, International Journal on Digital Libraries 1997) has inspired many follow-on papers on Web query languages.

Throughout his career, Alberto studied the deductive properties of data and knowledge bases. Particularly noteworthy are his contributions to understanding the semantics of updates in knowledge bases and the application of this to the problem of database updates. In work with Katsuno, Alberto resolved the important, and deep, issue of updating knowledge bases. By making a distinction between two kinds of modification, update and revision, they laid the foundation for studying updates within knowledge bases and established why updates are fundamentally different from belief revision.

More recently, Alberto was a central figure in the work on view-based querying. Starting with the innovative LMSS95 paper (Levy, Mendelzon, Sagiv, and Srivastava PODS 1995) that introduced the problem of answering queries using views,

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*SIGMOD Record* December, 2005

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Alberto made several important contributions to the emerging area of view-based modeling and processing. His recent work on fine-grained access control (Rizvi, Mendelzon, Sudarshan, and Roy, SIGMOD 2004) explores an application of view-based reasoning to the important area of data security and access control. This paper is already on the must-read list in data security.

Alberto's research was central to the development of many areas of database research such as database design, semantic query optimization, graphical query languages, and querying web data. But this very impressive list is by no means exhaustive. He also made important contributions to recursive query languages, on-line analytic processing, similarity-base queries, data warehouses and view maintenance, algorithms for computing web page reputations, and indexing of XML data. Perhaps more than academic evidence, the personal testimonies remain as Alberto's most lasting legacy. Serge Abiteboul wrote:

“Alberto belongs to a small group of people whose vision I trust. After many years, I realize how much I have learnt from discussions with Alberto, how essential his papers have been during these many years to shape the field.”

Alberto was an active member of both the database theory and database systems communities. He served as the PC Chair for PODS in 1991, as General Chair in both 1997 and 1998, and on the PODS Executive Committee from 1997 to 2001. He served as PC Chair for VLDB in 1992, and as a member of the SIGMOD Executive Committee from 1998 to 2001. Jeff Ullman wrote that Alberto was instrumental in bringing the SIGMOD and PODS communities together. He helped to establish a system under which the two conferences were run as a single meeting with two independent program committees. The first joint meeting was in 1991. Jeff commented that this “appears to have worked out to everyone's benefit.”

Alberto was a quiet man who did not seek out honors. He was modest about his role in shaping the foundations of relational databases and his pioneering work in laying the foundations for querying the web. His web page gives a glimpse into what Alberto found important. It prominently displays a 1978 picture of his colleagues and friends from Princeton whose friendship and trend-setting fashion sense he would refer to with a smile. Take a look at this picture. You will recognize many familiar faces of people who have gone on to shape computer science and database research – including a bearded and fully contented Alberto.

A few weeks before his passing, Alberto received the news that he had been elected to the Royal Society of Canada (the Canadian National Academy for Science, Engineering, and the Humanities). Alberto received the news with characteristic modesty. When it was suggested that he could now “rest on his laurels”, he laughed and made it clear that he was not done yet!

In response to the news of his passing, condolence emails have flooded into Toronto from all over the world. Many of the messages came from South America. Alberto was instrumental in bringing many South Americans to the University of Toronto and his long list of graduate students, postdoctoral students, and visitors reads like a Who's-Who of South American academics. Alejandro Vaisman reports that in the early eighties, Alberto was a key contributor to the creation

of the Computer Science Department at the University of Buenos Aires. Alberto Laender reports that Alberto was a good friend of the Brazilian database community. He visited Brazil several times and twice was the keynote speaker at the Brazilian Database Symposium.

Perhaps the most frequent theme in these messages were the appreciative remembrances of a kind, gracious, and welcoming Alberto who had helped and influenced many, many people, especially at the beginning of their careers. Claudia Bauzer Medeiros wrote:

“Alberto was always ready to help students, and to promote the advancement of the careers of other people. I will forever remember him as someone who liked to laugh, was patient in his explanations, generous with his time and who respected others. A very friendly and charming person, full of joy and curiosity. It was a privilege to have known him.”

Alberto's disease never stopped his work or dampened his humor. At the time of his passing, he was serving as the ICDT 2007 PC Chair and as a program committee member for ICDE 2006. He was also serving on the editorial boards of several journals, and as an associate editor for ACM TODS. Two of his papers were presented in September at VLDB 2005. A tribute to Alberto is being planned for PODS 2006.

We will remember a man who could talk appreciatively and knowingly about the latest Aerosmith or Coldplay album (he would of course cite J. M. Mendelzon and M. Mendelzon as the source of his knowledge on this and many other things). We will also remember Alberto's love of films, the Toronto Film Festival was one of his favorite yearly events. His partner Colette wrote:

“Next to travelling [the film festival] was probably one of our favourite activities – not just the films themselves but the hanging out near hotels, hoping to spot movie stars, like a couple of very silly teenagers.”

We cherished his fun-loving and teasing sense of humor, and the calm and open way he approached the various tasks and duties of academic life. Alberto was at his best after a good laugh, and he believed that innovation is more likely to flow from a research meeting at which there is laughter.

Alberto was the beloved partner of Colette Granger, devoted and proud father of José Manuel and Martin, step-father to Emma and Paul, loving son of Maria Gloria Rabinovich de Mendelzon and the late José Mendelzon, dear brother of Daniel and Ricardo, and brother-in-law to Marta and Paula. He will be greatly missed by niece Laura, nephews Ariel, Guillermo and Andrés, uncles, aunts and cousins in Argentina and Paraguay, and many friends and colleagues around the world.

To conclude, some personal remembrances from friends.

“Alberto has been an internationally known leader in the development of database theory over the last 25 years. During these years, he continually produced original and significant research, which had tremendous influence in shaping this field. Alberto's work has had a profound impact on my

own career. As a Master's student I read a paper he wrote as a Ph.D. student with Maier and Sagiv. I was greatly intrigued by the open questions they posed at the end of the paper, and these questions provided the inspiration for both my Master's thesis and Ph.D. dissertation. Alberto was not only tremendously respected by his colleagues for his scientific work, but was also extremely well liked for his unassuming manner, his sense of humor, and his warm personality. Even though we'd regularly meet only about once or twice a year, I considered him not only a good colleague, but also a friend. I will miss him greatly." Moshe Vardi

"Alberto was an outstanding mentor and role model for the students he advised (a total of 17 PhD and 31 MSc students). Observing Alberto's interaction with his graduate students one concludes that providing effective guidance to students working through challenging research problems was the most relaxed and enjoyable of tasks. I benefited from his calm advice before the seemingly daunting task of giving your first research talk at a conference. Later on, I enjoyed seeing this ritual repeated with several of Alberto's later students. Alberto had an enjoyable sense of humor. It was hard to avoid giggling at one of his understated jokes: you had the impression that you were not supposed to laugh given Alberto's delivery in the most serious lecture tone that you could imagine." Mariano Consens

"I presented my very first PODS paper at the one run by Alberto in 1991. I was very young and green at that time, and initially quite afraid and not knowing what to expect of how things go at such a conference. But Alberto's relaxed presence put me readily at ease. After being introduced to him he immediately put me at ease. Alberto's presence will be dearly missed by the community." Jan Van den Bussche

"Alberto was a gem of a person, in addition to being a brilliant researcher. I will always cherish his memories. Alberto visited IIT Bombay during his recent sabbatical. It was a pleasure to see his enthusiasm to explore and learn. I remember him discussing several Indian movies he saw, preparatory to coming to India. It amused him no end to find one of them was set in Toronto and featured a shopping mall he used to visit!" S. Sudarshan

"In spite of living abroad for more than thirty years, Alberto has always maintained close ties with Argentina, particularly with Buenos Aires, a city he loved. He was a key contributor to the creation of the Computer Science Department at the University of Buenos Aires in the early eighties, giving talks and courses each time he visited the city. It was during one of these visits when I decided to start my PhD career. I will always be thankful to him for giving me the chance to be his student. Alberto's kind 'Welcome!!' each time I arrived at Toronto will forever remain on my mind." Alejandro Vaisman

"In 1988 Alberto gave a tutorial on 'Logic and Databases' at the International Conference of the Chilean Computer Science Society. I had just finished my PhD thesis on mathematical logic and was looking for research directions in computer science. Attending that tutorial was an illuminating experience and I knew that at some point I would go in that direction. In 2000 I invited him to Chile, where I had several

students working with me on different subjects. I was impressed by the speed at which Alberto was able to interact with them, posing the right questions and giving them the right feedback. Alberto was always generous with his time, knowledge and ideas. The Latin American community, in particular, will miss him enormously." Leo Bertossi

"Alberto had a very unique personality. His clarity of thought and sharpness were and always will be a source of inspiration. He was often brief but his statements made you think deep. As a new Ph.D. student, I remember often getting excited about new papers that I just read and was asking him why we didn't pursue this or that. I found his response 'because we don't know that area well' very thoughtful. He was one of very few databases researchers who was working on the Web as early as 1994 and became the program chair of the WWW conference in 1999. Now that we can see the two areas (databases and the Web) have had so much influence on each other, his vision is admired. I enjoyed every moment of my Ph.D. work under his supervision and I will be missing him a lot."

Davood Rafiei

"Alberto was a truly inspiring and incredibly likeable person. It puzzled me for a long time how such a busy and celebrated researcher could be so generous and patient in advising his students. With time, I witnessed the same dedication and competence in his teaching, either graduate or undergraduate courses, and in his service to the academic community. Alberto has taught me a lot more than his professional duties required, and has set an example that deeply inspired me. For his generosity, I am forever indebted. But, above all, I will greatly miss his constant good company, at a research meeting, at a technical session in a conference, or at a pub watching a soccer game." Denilson Barbosa

"My fond memories of Alberto are mostly personal, his wit, his humor, his love of movies. We always ended our academic discussions with: '... so have you seen any good movies lately?' Alberto and his Latin American students made me want to learn Spanish and I remembered how he corrected me when I used the Spanish plural form, which I thought was the proper form, to address him!"

Dimitra Vista

"Alberto's research played a fundamental role in several quite different research areas, including relational database theory, belief revision, and Web querying. Many of his papers have become classics. For example, his paper with Hirofumi Katsuno 'On the Difference between Updating a Knowledge Base and Revising It,' that appeared in KR'91, is one of the most cited papers in the area of belief revision. However, Alberto was one of the true pillars of the SIGMOD/PODS community not only because of his many research contributions, his extensive service responsibilities, or his impressive record of supervising doctoral dissertations, but also because of his warm, friendly, and generous personality. He was genuinely interested in other people's research and took a pleasure in their achievements, and was always willing to help. He didn't shy away from criticisms but delivered them in a gentle, good-natured, and often humorous way. It is hard to believe that one will no more be able to stop by his office to discuss the latest research issues or just

chat with him. We will all miss him very much.”

Jan Chomicki

“I do not remember when I first met Alberto. When I moved to Canada in 1984, he was already here. I think we got to know each other in the late 1980’s. Starting with the 1992 VLDB Conference in Vancouver, we worked on a number of projects together. Alberto was always a source of calm, quiet and sound advice. In many ways, our personalities were quite different, but I always enjoyed his company, his friendship and his understated humour. He was a force in the database community and his influence went way beyond the Canadian scene. I will miss him both as a friend and as a colleague.”

Tamer Özsu

“I will remember Alberto as a creative researcher who constantly pushed our field in new directions, a wonderful colleague and a generous supporter. Alberto impacted my career at several key points. As a graduate student, his paper on belief revision greatly affected the way I thought about formalizing the properties of irrelevance, the topic of my Ph.D thesis. A couple of years later, I actually met Alberto while he was visiting AT&T Bell Labs, and had the pleasure of working with him on answering queries using views. In addition to the productive collaboration, Alberto’s feedback greatly contributed to strengthening my confidence as a young researcher. Later on, when my colleagues and I got interested in languages for querying semi-structured data, I found his work on WebSQL to be very influential on my thinking, and our StruQL and XML-QL languages were greatly impacted by it. In short, Alberto was one of few researchers whose work I always found interesting and inspiring, and whose support and friendship I could always count on. His presence in our community and his good humor in our informal gatherings will be sorely missed.”

Alon Halevy

“I felt like a bigger person in Alberto’s presence. There was an atmosphere of emancipation around him, which was very conducive to research and discovery. I wrote my best papers with Alberto as co-author, and cracked my best jokes in his company. There will never be anyone like him.”

Gösta Grahne

“One oddball memory I have of Alberto is my visiting him while he was working at Yorktown Hts. It must have been in the very early 80’s. Alberto showed me the new ‘conversation pits’ that they had installed in the hallways, and suggested we try one out. These were nothing but depressed areas with a whiteboard. So we started throwing symbols up on the whiteboard, talking about random topics about relational databases. A half hour later, we had the idea of acyclic schemas and the first of their interesting properties. We both talked the idea up, and the result was a paper with several other authors who had contributed properties — Beerli, Fagin, Maier, and Yannakakis.”

Jeff Ullman

“The database community owes a huge debt to Alberto, not only for his visionary research but also for his warm and cheerful personality through which he helped so many young researchers. Although I only met Alberto occasionally, I always regarded him as a friend, and we had plans to get together and do some joint work. Sadly this is not to be.

Like all of my colleagues, I shall miss him greatly; but we can take some comfort in the inspiration and encouragement he has given to us.”

Peter Buneman

“It was the end of 1987 and I had just started my Ph.D. investigating the possible usage of diagrams and direct manipulation in interacting with databases, i.e., providing the user with a so-called visual query language. This idea is now almost trivial, but at that time it was quite new and intriguing. Basically, we had in mind database issues such as the expressive power of query languages, query evaluation, SQL, etc., and how to couple them with ease-of-use. While working on expressive power, I concentrated on expressing non-relational queries, such as transitive closure. Extending the expressive power of query languages was very fashionable at that time, especially because of the growth of Datalog, and graphical query languages with high expressive power were mainly proposed by Alberto Mendelzon’s group at the University of Toronto (they were then working on the  $G^+$  language). When I started studying their work, I was so impressed that I decided to concentrate much more on the formalization of QBD and compare its expressive power to  $G^+$ . We did not have e-mail (I know it is hard to believe, but this happened more than fifteen years ago) so I wrote a ‘real’ letter to Alberto. He replied quickly and in the meantime asked one of his Ph.D. students, namely Isabel Cruz, to give me more detailed answers, that helped a lot in writing my first journal paper. I was so impressed by the technical level of Alberto, I was still a young Ph.D. student and quite afraid of meeting an already famous researcher like Alberto. However, as soon as I got there everything was smooth, easy, and pleasant. Isabel and the other students were great, but Alberto was extremely friendly, as I would have never expected from a very busy professor. He spent a lot of time with us, both discussing visual languages and just enjoying. After that visit we met many other times, and he was one of those rare people who is always a pleasure to meet. His jokes and smiles as well as his scientific work will stay with us forever.”

Tiziana Catarci

“What to remember about this wonderful man? In a desperate search for the ‘right thing to say,’ I dug into the tons of emails we’ve exchanged over the years. His comments, elegant proofs, very challenging questions, the usual business from a great mind... But, in the middle of the draft of a grant proposal, you will find some (so very to the point) Bob Dylan lyrics. And beautiful extracts from poems by Cummings and Ferlinghetti. A referee report prefixed by his brilliant critic of a new movie...”

This is how I remember Alberto, a wonderful colleague, so smart and so warm, who loved research and, with just the same enthusiasm, loved life... and made you love both.”

Tova Milo

*Outside the leaves were falling  
and they cried  
Too soon! Too soon!*

Ferlinghetti

“Alberto was since the very inception of the Web interested in the data models and database problems arising from this new phenomena of information management. He worked on XML databases and query languages for the web,

and pioneered research on databases in the RDF data model, the recommendation for a metadata model for the Web of the W3C. His last PODS paper (2004) introduces normal forms and studies their complexity for RDF data as well as the theoretical basis of conjunctive queries over this data. This work established the connection between database theory and semantic web research.”

Claudio Gutiérrez and Carlos Hurtado

“I started working with Alberto on relational theory in grad school at Princeton in 1977. My thesis work was on NP-completeness of sequence problems, but Catriel Beeri had arrived in 1976 and gotten Jeff Ullman and most of his students started doing database theory. I started working with Alberto and Shuky Sagiv on that topic, too, while writing up my thesis. Alberto often served as my personal tutor in the area, and our collaboration continued while he was at Watson and I taught at Stony Brook. Looking back, I see he was the Princeton classmate I wrote most papers with. While the direct collaboration wound down after he moved to Toronto, we still enjoyed interacting, which included a summer he and his family spent here in Oregon in the 1980s. I feel like a little piece of my history has passed away with him; I’ll miss him.”

David Maier

“My first ‘contact’ with Alberto came when I began reading his research on dependency theory and on the fundamental connections between properties of hypergraphs and database design. His pioneering work was inspirational in shaping my own doctoral work. Interestingly, I later became Alberto’s postdoc! Indeed, I was one of his earliest postdocs. I was delighted when I received the news of the postdoc offer, conveyed to my Alma Mater, Indian Institute of Science, Bangalore, and relayed by my friends to me at a remote village, where I was vacationing with my parents. Once I arrived in Toronto, there were so many things new and unfamiliar to me. I still vividly remember the warm and supportive environment that Alberto offered me. In fact, it was Alberto who decided ‘Lakshmanan’ is too complicated for the North American tongue and ‘officially’ made ‘Laks’ my first name. Alberto’s incisive, methodical, and no-nonsense approach to research would leave an indelible impression on me for years to come. It is a pleasure and privilege to have known this great man, who faced his disease and his ultimate death with the same calm, courage, and repose that he displayed when attacking fundamental problems in database theory. I will miss him dearly.”

Laks V.S. Lakshmanan

“In the same way as many of our colleagues, I first ‘encountered’ Alberto by reading one of his papers. For me, it was the STOC 1979 paper on schema equivalence, often cited as BMSU, and then the 1979 MMSU papers on adequacy of decompositions. I was working on my ‘laurea’ thesis at the time, and all the authors were impressive to me, by definition. A few years later, Alberto would show me his great personality, humor and modesty by just saying ‘yes, I am the “M” in these papers.’ I am deeply indebted to Alberto: I went to Toronto as a postdoc, formally visiting another group, but he invited me to collaborate with his as well, and in the subsequent years he hosted students of mine for midterm visits, which were really productive, as he was always open to advise, listen and collaborate. I also had the

pleasure to host him in Rome various times, and we could share long discussions on many different things, not only scientific. We also shared interest in soccer, and we would often comment on it, especially with reference to the many Argentinian and Brazilian players in Italy. We missed soccer in Toronto, and when he took me to a baseball game as a surrogate, I promised that during his next visit to Rome, I would take him to a game at the Olympic Stadium—I wish I could still keep my word.”

Paolo Atzeni

“I knew Alberto when he lectured a short course on Logic and Databases in 1987, at ESLAI, La Plata, Argentina. At that time I was a part time lecturer on databases, mainly on the practical side of them, while still working in the industry. In his lectures I discovered a fascinating new dimension in the field, which made me eager to learn about logic and theory in general. It was a big effort at that time for me to pass his course, given my lack of theoretical formation. But that course, and the few talks I had with Alberto during it, meant something very important for my life. I think that it was at that point that I decided to move from the industry to academics. I started to study on my own and finally, in late 1990, at a rather unusual age of 38, I decided that I should do a PhD. Of course I thought of Alberto, and he kindly accepted. That was extremely important to me. He gave me his confidence and support in so many ways, and our meetings were so illuminating to me, that I am convinced at this point that it was him who made it possible for me to carry on with the change I expected for my life. He also very generously assisted me with his funding for a visit to him for six months in 1995. That period of time was essential for my research. Alberto was not only a brilliant and successful scientist and teacher, he was mainly an excellent human being, and a part inside me died together with him.”

José María Turull-Torres

“I remember once mentioning to Alberto that he had been my PhD advisor. With his characteristic and unforgettable smile he corrected me and said that the past tense was not appropriate as he still was my PhD advisor. I also remember well the long research meetings in his office, where he never failed to impress me with his quick and critical thinking. I was particularly mesmerized that he always seemed to be at the center of some new and exciting result. Other more informal conversations we had over the years would flow effortlessly between topics, including the appreciation of a good wine or of music (true to his origins, Alberto was proud of Argentinian musicians and of sharing his last name with Felix Mendelssohn’s). I remember particularly two recent dinners where Colette was also present, one in Chicago in 2002 (right after SIGMOD) and one just last year in Toronto (during VLDB). The former dinner was particularly upbeat as we had plenty to celebrate: his upcoming sabbatical (he was making plans to come to Chicago for a couple of months) and my new job. However, last year’s dinner was particularly moving as we reminisced about the ‘old times’ and especially as Alberto acknowledged ever so discreetly the loving support of Colette and of his two sons Manuel (also present) and Martin. I will cherish these and many other fond memories I have of Alberto Mendelzon, the brilliant researcher and caring mentor who will always be my PhD advisor.”

Isabel Cruz

“Alberto Mendelzon was my advisor during my PhD years in Toronto. Though, to say that he was merely my academic advisor, would be an understatement. Alberto definitely played a major role in shaping my way of thinking about research problems and in determining what are the right questions to ask when trying to tackle them. I feel extremely fortunate for having him as my guide in this endeavor.

Nevertheless, outside of his academic suit, Alberto was equally approachable, engaging, and fascinating. He was ready to get involved in stimulating discussions on a wide variety of topics, and eager to learn about anything that escaped his broad knowledge. He had a certain predilection for Greek easter cookies, and was passionate about blues.

I think that Alberto had always been flirting with *realismo magico*. Thus, he would sprinkle his life with both salt and pepper. He would take joy from the small details of life, and he would never be anything less than generous. I also believe that he would be very content to know how much, and in how many different aspects, he managed to positively influence the lives of the people around him. I can almost picture him now: smiling back to us, with one of his wide, modest, heartfelt smiles...

Hasta luego, maestro!”

Themis Palpanas