Franklin's database career spans academia and industry

Michael Franklin (B.S. '83) recalls a time when he would feel obliged to start his Introduction to Database Systems course by explaining that computers had important uses beyond number crunching. "Now, students come to class experienced in using computers for data management, having grown up using them to handle everything from their music and video collections to their interactions with friends. This shift is a result of the pervasive spread of data-intensive applications on the web and mobile devices," says Franklin, Professor of Computer Science at the University of California, Berkeley, and a Founder and CTO of Truviso, Inc., a Silicon Valley developer of data analytics solutions.

In a career spanning academia and industry, Dr. Franklin explores how the core lessons learned from large-scale database systems can be applied across a spectrum of data-intensive applications including: large-scale analytics, pervasive computing, distributed systems and information integration.

Database systems provide two somewhat miraculous features, says Franklin. First, they provide guaranteed correctness and durability of data manipulation operations. Second, through an abstraction principle called "Data Independence", they enable long-lived applications to run efficiently as the underlying data, software, and hardware evolve and as the applications themselves change over time. Unfortunately, for years these benefits were locked inside of complex and cumbersome systems that were expensive to buy and maintain. Franklin's research has been focused on liberating this technology.

An example is the HiFi project. The idea for HiFi came to Franklin while he was attending a meeting of a group tasked with standardizing interfaces for RFID-enabled systems. Group after group described the data structures and API of their layer of the system. "To me, it was clear that each group was presenting their own data model and query language, but each one was different," says Franklin. "This lack of consistency was leading to a complex architecture and a baroque set of standards."

Earlier project developments in the Berkeley Database group included a "streaming" SQL processor (SQL is the standard language for accessing Relational Database Systems) and an SQL interface to dynamic, wireless sensor networks. "It occurred to me that we had already developed most of the technology needed to create an end-to-end distributed SQL-based system that would manage RFID and other sensor data. So the HiFi project was created to build the infrastructure required to put such a system together," adds Franklin. Using SQL to cross all the layers had multiple benefits. First, the system was able to leverage years of database systems technology, rather than having to

build it from scratch. Secondly, the Data Independence assumptions underlying SQL made it easy to write applications that were independent of the underlying network topology. Finally, since sensor-rich applications would ultimately have to integrate with other components of enterprise IT infrastructure, speaking SQL was a natural fit since most of the back end systems also speak SQL.

"The main impact of HiFi and its related projects was to get people to think differently about how the key insights of database technology could be exploited in non-traditional environments," says Franklin.

In 2006, Franklin took a leave of absence from his faculty position to start Truviso, Inc., a company he founded with his former Ph.D. student Sailesh Krishnamurthy. "Since database research is aimed at addressing real-world problems, impact is ultimately measured by real utility rather than by paper count," Says Franklin. "The amount of data that companies have to deal with is growing faster than Moore's Law. That means, if you are dealing with data, your computers are effectively getting slower every year," adds Franklin.

"It turns out that Database systems have a fundamental bottleneck. Namely, that you need to first store the data before you can do anything with it," says Franklin. "In a world where all data is on the move, traditional database systems are basically an end-point rather than a part of the dataflow." Truviso addresses this problem through a technique called "Continuous Analytics", and has convinced a number of high-profile traditional database users to switch to this new way of handling their data. "Companies in high-growth

industries are seeing data volume growth of up to10x a year," he adds.

Franklin, who resumed his duties at Berkeley in 2008, credits his entry into the database field to his undergraduate education at UMass Amherst and to a promise he made to his parents to finish his studies on time, even after taking time off. "I spent my Junior year studying abroad at Hebrew University in Jerusalem," says Franklin. "I decided to leave that program early to live on a Kibbutz (a collective farm – I harvested bananas mostly) and backpack around the region and Europe."

In order to graduate on time, Franklin needed to earn credits during winter intersession. He started knocking on faculty doors looking for a project, and Dave Stemple offered him an independent study with the Database lab, given his prior experience in Bruce Croft's database course. "That experience led directly to my first job upon graduation, a database development position at Wang Laboratories, and I have been working in the database field ever since," adds Franklin.

After obtaining a Masters degree, Franklin took a programmer position at MCC, working on large-scale parallel database systems. "The group I joined pioneered many of the techniques that underlie modern data-parallel processing approaches such as Map-Reduce and Massively Parallel Data Warehousing," says Franklin, who then went on to complete his Ph.D. at the University of Wisconsin-Madison, and from there joined academia. He is an ACM Fellow and a recipient of the NSF Career Award and the ACM SIGMOD "Test of Time" Award. At Berkeley, one of Franklin former students was Yanlei Diao, an Assistant Professor in our department.

All in the *Franklin* family

Franklin family of CS alums (l. to r.): David, Sherryl, and Michael

It was definitely a family affair in the 1980s with three Franklin siblings in the CS Department (then COINS) at UMass Amherst. Michael Franklin (B.S. '83), his brother David Franklin (B.S. '87), and his sister Sherryl Franklin Radbil (B.S. '82) are enjoying successful careers in computer science after graduating from the department. Two more people from the next generation of Franklins also came to UMass Amherst.

Michael is a Professor of Computer Science at the University of California, Berkeley (see previous page).

David is the Product Manager and Technical Support Manager for Boston-based Proxy Networks, Inc., a lead-

Tuomas Sandholm (Ph.D. '96) was named an ACM Fellow for his contributions to combinatorial auctions and mechanism design.

Brent Heeringa (Ph.D. '06), Assistant Professor of Computer Science at Williams College, was awarded a National Science Foundation grant for his work on "Models and Methods for Information Organization."

Andy Podgurski (Ph.D. '89) received media attention in *Science Daily* for his research on electronic health records. Professors Arnold Rosenberg and Lori Clarke co-chaired his Ph.D. thesis committee.

Virtual Iron Software, Inc. announced that Steve Beckhardt (M.S. '74) was named as a founding member of the company's advisory board. Beckhardt is president of Red Brook Harbor Consulting, a software consulting and design firm. Previously, he was vice president of software engineering at ThingMagic, a company working in the area of RFID and intelligent embedded control systems.

Daniel Barrett (Ph.D. '98) has published *MediaWiki*, his seventh book, with O'Reilly Media, on programming and administering the software engine that powers Wikipedia. Barrett is currently Director of the Learning & Knowledge Management group at VistaPrint (www.vistaprint.com).

EnterpriseDB, a leading enterprise open source database company, announced that Larry Alston (B.S. '85) was named vice president of marketing and product management. Previously, he was the vice president and general manager at IONA. Earlier in his career, Alston was the vice president of products at Pantero. Prior to that, he was corporate officer and executive vice president of product management and marketing at eXcelon.

Mark Smucker (Ph.D. '08) and his wife Amy are pleased to announce the birth of their daughter Vivienne, born on November 8, 2008.

ing provider of software for management and remote control and access. Prior to this position, he was with start-up company Epoch Systems before it was acquired by EMC Corporation, where he remained as Principal Software Engineer for over 15 years.

Sherryl is a software developer in the Test & Measurement group of The MathWorks, makers of MATLAB and Simulink. "My very practical training at UMass Amherst allowed me to really hit the ground running fresh out of college at my first job at a large aerospace company," says Radbil. Her career led her through jobs at a computer manufacturer to ATE (Automated Test Equipment) to her current position.

Two of Sherryl's four children joined their mother's alma mater. They both were accepted in the UMass Amherst Isenberg School of Management as part of Commonwealth College. Leor graduated in 2008, and Tomer will graduate in 2009.