

Dexter Kozen: A Winning Combination of Brilliance, Depth, and Elegance

David Harel

This is a somewhat non-standard piece about Dexter Kozen, longtime colleague and friend. I am sure that the praise of Dexter's research will have been sung by many of the people contributing to this volume. I could probably have added my own perspective, talking at length about the enormous impact of his most profound work. For example, the wonderful paper on alternation influenced my work on seemingly unrelated topics years later, in many unexpected ways.¹

However, on second thoughts, I decided to do it a little differently. I'm going to tell you why I decided not to write a paper for this volume in honor of Dexter, but instead to write a *laudatio*. A paper would have been easy, right? We all do research and write papers, and it shouldn't be too much of a problem to select a fitting one for the occasion. So, why not?

Well, there are two reasons: The first is that any paper I could have written, which would have been in some way relevant to a volume in honor of Dexter Kozen, would have fallen short, in the following sense: Dexter would have read it and would probably have thought: "Oh yea, that's kind of interesting, and yes, I can see how those proofs go; and, by the way, here is how to continue the work and get far stronger results, and in a much nicer way". (This is the best case, of course; it could be a lot worse. Dexter sees errors, gaps in proofs, shaky arguments, etc., very quickly...)

The second reason is a lot more acute. I simply can't write a paper befitting this volume, because I stopped doing theory of computation almost twenty years ago. Why? Well, that's an easy one: It's Dexter. He's the one to blame.

Let me explain: Dexter Kozen is absolutely amazing! IMHO, he is one of the most brilliant theoretical computer scientists of our generation. But it's not just his cleverness and depth and the wonderful work he's been able to produce, but also the unparalleled beauty of his thinking and of the way he goes about doing his research. A work session with Dexter was always a combination of exhilaration and frustration. He had the uncanny ability to bring in, out of the blue, unexpected notions from seemingly unrelated branches of mathematics – often from algebra or topology – which either you'd have never heard of, or you'd have long-forgotten. And these then turned out not only to be relevant but to make everything you wanted to do fall into place, and in a concise, exotically elegant and often stunning way.² Such collaboration

¹ As is well-known, Dexter's work on alternation appeared initially in his singly-authored *FOCS'76* paper, independent of the Chandra-Stockmeyer paper that was published back-to-back with it in the same volume; the two later became the famous combined, triply-authored *J.ACM* version.

² For me, an excellent example of this was his introduction of ultra-filters into our work on dynamic logic.

was, of course, exciting and extremely fruitful, but could also be frustratingly depressing. By the way, Dexter would later go off on beautiful tangents, open up new avenues, ask new questions and then obtain more, and stronger, results. At that point most of us simply give up...

As a result, I figured that someone who produced the most succinct and beautiful proof imaginable of completeness for PDL³, who went on to provide a virtuosic treatment of the far more challenging μ -calculus, who placed logics of programs in an elegant Kleene-like algebraic setting, and on and on and on (and all this without mentioning his fundamental contributions to complexity theory, and a whole slew of more recent work that I haven't been able to follow); such a person causes one to want to become a taxi driver....

No way could I do theory that would even come *close* to what Dexter was able to produce in his seemingly effortless way, out of his sleeve. So I quit. Not to become a taxi driver, but to do different things, which require far less of the qualities that Dexter had in such amazing abundance.

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What else can I say? Please accept my heartfelt wishes, Dexter, for many more fruitful years of scientific productivity, and health, joy and bliss. Enjoy your family and enjoy life!

I am proud to know you and to have been able to work with you and to learn from you.

³ Dexter's work was based on ideas from Rohit Parikh's original proof of the completeness of the Segerberg axioms for PDL; the two ended up publishing jointly.