

a Tribute to Edsger Dijkstra

[Eric C.R. Hehner](#)

Department of Computer Science, University of Toronto
hehner@cs.utoronto.ca

I have had a career-long interest in formal methods of program design, and I still teach a course with that title. My introduction to the subject was the book *a Discipline of Programming* by Edsger W. Dijkstra in 1976. I wrote my first paper on the subject that same year. So I was eager to meet Edsger when he came to Toronto for the IFIP Congress in 1977. He had read my paper and agreed to meet me. He introduced his just completed PhD student Martin Rem and me to each other. Martin and I connected both personally and in our research interests, freeing Edsger from baby-sitting duties.

Following the IFIP Congress, Edsger went to an IFIP Working Group 2.3 meeting in Niagara-on-the-Lake, where I was the newly appointed secretary of the group. My paper, which was critical of some aspects of Edsger's work, was a topic of discussion. Edsger was a very important person, and I was nobody, and that provoked several people to defend Edsger. But Edsger found merit in my criticisms. He was more willing to consider how his own work could benefit from the criticisms than some of the others in the room.

After the working group meeting, Edsger had a couple of days to kill before his flight back to the Netherlands, so he came to my house. My mother was also visiting just then. Back then, my mother and Edsger were smokers, and I didn't allow smoking in the house, so they went out on the front porch together. My mother happened to mention that she was not fond of existential proofs with no instantiating example (witness). Well, after that, Edsger and my mother talked only to each other; I might as well have been dead.

Four years later I had the opportunity to return the visit, staying in Nuenen. Since their son Rutger was away, I was given his bed. When we returned from a ride on the tandem bicycle, Edsger's wife Ria noticed a hole in the back of my pants. Edsger tried to shush her, but too late. He had noticed it too, but he didn't know if I had a replacement pair. He reasoned that I would be better not knowing there was a hole than knowing and unable to do anything about it. Fortunately, I did have another pair. But it stuck in my mind as an example of Edsger's kind consideration, quite opposite to his stated philosophy of "telling truths that hurt".

After Edsger moved to Austin, he held the Year of Programming in 1986-1987. A variety of formal methods researchers spent all or part of the year in Austin, and I was fortunate to be included. This put me in almost daily contact with Edsger for several months. One of the benefits for me was sitting in on Edsger's undergraduate course on Mathematical Methodology. I sat with Wim Hesselink because we were somewhat out of our age group. Each class Edsger arrived with a problem to be solved. The lesson was how the formal expression of the problem guides the solution, or in his words, "let the symbols do the work". What I learned in that class permeates my formal methods course today.

Another benefit to me of the Year of Programming was participation in the Tuesday Afternoon Club. I had attended one or two of these in Eindhoven, and in Austin I attended several more. Each week we read a paper, chosen by Edsger; someone read aloud so we were synchronized and the pace was slow. Anyone could ask a question or make a comment or criticism at any time, and the criticism could be at any level, from syntactic (how well is the idea expressed) to semantic (how valid is the idea) to judgemental (how important is the idea). I was amazed at

how productive and effective this format is. On my return to Toronto, I instituted a copy of the Tuesday Afternoon Club (but not on Tuesday afternoon).

From 1977 to 2001, about every 9 months, I had the pleasure of talking and dining with Edsger at IFIP Working Group 2.3 meetings. At one such meeting one evening, Edsger saw that I was stuck listening to a known pompous bore. Edsger came across the room, apologized for butting in, and said that I was urgently needed to settle an argument in his group. He rescued me.

Towards the end of his life, Edsger became concerned about his legacy. One day, walking to lunch, Edsger said to me “In a hundred years, the only thing left of all my work will be the shortest path algorithm.” He may have expressed the same thought to others because J Moore said, In Memoriam, “Without a doubt, a hundred years from now every computer scientist will study Dijkstra's ideas, including

- the mathematical basis of program construction,
- operating systems as synchronized sequential processes, and
- the disciplined control of nondeterminacy,

to name but three.”.

In my last letter to Edsger, I said “All of us have taught literally thousands of students, who take away thoughts that originated in your head. And your influence is not just technical. Your way of working, and your ethics, have become mine as well as I am able to emulate them. What I want to say is: thank you. With great admiration and affection, Rick”. His last letter to me, handwritten of course, dated Nuenen, Friday 19 July 2002, just 18 days before he died, said “I thank you for your friendship.”. I treasure that letter.

Here is a picture taken in Austin in 1990 at Edsger's 60th birthday party. He asked me to sit next to him at the head table. (To my right is Elaine Gries.) Note Edsger's bolo tie.

