Know the Person behind the Papers

Robert Cori

Bio: *In 1967, Robert Cori was a doctoral student of Marco Schützenberger joining a pioneering research team in Paris where, among others, J. Berstel, M. Nivat, J.-F. Perrot created the French School of theoretical computer science. His first subject in research was the use of context-free languages as a tool for getting enumerative results for families of graphs. After defending his thesis he obtained a professorship in the University of Bordeaux. There computer science was just a tiny bud in the math department. The bud grew after the arrival of B. Courcelle, X. Viennot and A. Arnold in the next years. In 1982 he was in charge of creating a French collaborative program named Greco de Programmation, this helped to attract people and funds in Bordeaux and build the LaBRI. In 1992, he obtained a part-time teaching position at the Ecole Polytechnique in Paris, which he kept for 15 years. He rubbed shoulders with many computer science researchers there, including J.J. Levy, Claire Mathieu, P. Rosenstiehl and supervised a few doctoral smart students. He is Emeritus Professor at the University of Bordeaux since 2009.*

We ask all interviewees to share a photo with us. Can you please tell us a little bit more about the photo you shared?

Robert: I share two photos. The first above was taken in June 2009 during a three-day meeting organized for my 65th birthday. It also corresponded to the end of my teaching years. The place is in front of the LaBRI building at the University of Bordeaux. On this photo you may recognize researchers who were my doctoral students, some colleagues from LaBRI, others in Paris or Italy, and some Master's students from Polytechnique who came to Bordeaux for the occasion.

The second picture is taken in 1988 in Paris 7 University, I am sitting between Marco Schützenberger and Dominique Perrin during a meeting of a thesis jury.

Can you please tell us something about you that probably most of the readers of your papers don't know?

Robert: Readers of my articles probably don't know that I view research primarily as a kind of game that has allowed me to play with many co-authors and many very brilliant PhD students. However, although teaching is considered by many scholars to be the second most important duty after research, I have devoted time to it as my first priority. It is not easy at certain times to obtain psychological well-being by only doing research, on the contrary I have always achieved it by giving well-prepared courses in front of brilliant students.

Is there a paper which influenced you particularly, and which you recommend other community members to read?

Robert: I recommend many articles by Deepak Dhar which are motivated by describing physical phenomena in mathematical terms which can be very close

to theoretical computer models like finite automata or cellular automata. These articles can give rise to many developments thinking the matter inside as models in theoretical computer science. One of them is *Theoretical studies of self-organized criticality*, which inspired my research, I suspect that many others published by him more recently may give rise to pertinent questions about automata and graphs which may open up new problems in these subjects.

Is there a paper of your own you like to recommend the readers to study? What is the story behind this paper?

Robert: I recommend the paper we wrote with Dominique Rossin entitled *"On the Sandpile group of Dual graphs"*, it appeared in 2000 in the European Journal of Combinatorics. A first version of this paper was a preprint written in 1998 which was available at the Computer Science Lab in Polytechnique. We thought with Dominique that we were the first to give an algebraic presentation of the Sandpile model introduced by Dhar. In fact this was not correct since the model was also considered by N. Biggs with the Chip Firing Game introduced by Björner, Lovasz and Schor. So that the publication of our paper was only possible since it contained a special result on dual planar graphs. However our paper was read by Don Knuth who was inspired to find an algorithm generating all spanning trees of a graph. He presented this algorithm and made a few presentations of ours around the world giving a good advertising for the paper. He also delivered a talk on our version of sandpiles and spanning trees in Stanford for his eleventh annual Christmas Tree Lecture in December 2004.

When (or where) is your most productive working time (or place)?

Robert: When I work alone the best is very early at home in my office. But I also very often try to chat with others at any time in front of a blackboard with chalk in the past or now whiteboards with markers.

What do you do when you get stuck with a research problem? How do you deal with failures?

Robert: I do not consider as a failure to spend time on a research problem, if I did not succeed to solve an open problem I consider that I learned a lot while reading the papers of other researchers working on it.

Is there a nice anecdote from your career you like to share with our readers?

Robert: When I started my thesis with Marco Schützenberger as a referent, I occupied a shared office at the Institut Blaise Pascal in Paris. The building was left by an abandoned factory and was located in the far north of Paris. There was no space available in the *Quartier Latin* for the huge computer dedicated to the Department of Applied Mathematics of the Faculty. The Henri Poincaré

Institute where Algebraic Geometry and Differential Analysis flourished could not accommodate offices for Theoretical Computer Science.

I shared an office with a researcher working in Artificial Intelligence, his daily behavior puzzled me. He walked into the office every day with a huge deck of punched cards. It contained the chess player's algorithm program he had designed. He had taken it to the computer center before coming to the office with also a quantity of paper listing the outputs of the execution of the program on the computer. It was the program's response to the motion it gave as input to the program. Then, his concern was to analyze this answer and to proceed to the improvement of the program.

This led him to remove some cards from the deck to go punch many others, add them to the game and return it to the computer center. He often had the opportunity to repeat this process once in the afternoon. Because I was reluctant to chat with a researcher ten years my senior, and he was very busy, we didn't talk much. This behavior did not make me consider changing the subject of my research. The discussions with Marco on the theory of languages were a far superior attractor.

Do you have any advice for young researchers? In what should they invest time, what should they avoid?

Robert: I don't have very original advice on this subject. I think that one must above all avoid remaining alone on a difficult question. So a young researcher should ask for another direction of research if the current one seems to him intractable.

What are the most important features you look for when searching for graduate students?

Robert: Since I am emeritus I am not allowed to advise PhD students. In the past I often hired those students who attended my master courses or were interested in a talk I gave in a conference or in a seminar.

Do you see a main challenge or opportunity for theoretical computer scientists for the near future?

Robert: It suffices to consult recent scientific journals devoted to this field to see the number of interesting open problems. Applications of theoretical computer science to other sciences have great developments.

What kind of opportunities should EATCS offer to researchers, and especially to young researchers?

Robert: The surveys and tutorials in EATCS journal are often excellent texts helping to introduce new subjects to PhD students. Conferences should not be

limited to hundreds of people each one speaking less than 20 minutes of his last result. ICALP seems to go in the good direction by proposing many invited talks.

What can be the role of EATCS in solving the challenges of our society?

Robert: This is a big question that deserves long reflection and discussion with those responsible for education. EATCS may just promote minimal knowledge of what an algorithm really is and what a machine can actually learn.

Please complete the following sentences?

- *My favorite movie is...* Amadeus by Milos Forman, a brilliant demonstration that happy people are pleased by the happiness of others and the miserable are poisoned by envy.
- *Being a researcher...* is a wonderful gift given to you.
- *My first research discovery..* allowed me to cross for the first time the Atlantic in order to present it in a conference and to meet William Tutte.
- *Theoretical computer science in 100 years from now ...* will concern a few people working in a hot planet.
- *EATCS in 50 years from now will...* still help researchers to understand what is real progress and what is just a gimmick .
- Considering research and teaching as essential activities and do not spending too much time on administrative tasks *...is the key to being a happy academic.*