

A hidden garden

Henri Poincaré's picture in front of my office inspires me to start by writing about this place: he entered École Polytechnique in Paris almost 150 years ago. His name has never left this school, although his research raised his name even to lunar craters. Right behind Poincaré's room in our lab, there is a room dedicated to Évariste Galois who in his short life of only twenty years, laid the foundations of what is now called Galois theory. A few kilometres further, inside Paris, the names carved on the walls and monuments have other interesting histories to tell: Place Monge, Rue Lagrange, Rue Descartes, without forgetting all the names engraved on the Eiffel Tower: Ampère, Arago, Béranger, Cauchy, Carnot, Delaunay, de Coriolis, Foucault, Fourier, Fresnel, Lagrange, Laplace, Monge, Navier, Poisson . . .

Not only these names engraved on the walls are witnesses of the Mathematics' history in Paris, walking in the busy neighborhood of *Quartier Latin*, one could think of all the scholars, artists, authors, philosophers, musicians who got inspired from this same beauty during all this time. I think anyone who has ever lived this experience, has gathered a bag of inspiration. Even someone like me who is neither a pure mathematician, nor a native Parisian, could witness a tiny part of this history.

I am a Persian computer scientist working at the computer science lab of École Polytechnique in the south Parisian suburb. After two years of study at Sharif university in Tehran, I came to Paris at the age of twenty to continue my undergraduate studies. I was fascinated by mathematical logic, algebra and geometry. Having my *roots* in Iran, Mathematics and Paris were the two *grounds* in which my own logic and passion for life grew up together.

Given this background, my belief is that Mathematics and Paris are inseparable in the history. If we remove what happened in Paris from the history of mathematics, we would miss the enthusiasm which shines from Poincaré's face talking to Marie Curie in the historical picture of the 1911 Solvay conference, beside Einstein and all the other scientific personalities. We would also miss the revolution made by Alexander Grothendieck and the creation of modern algebraic geometry. It is almost unbelievable that all those triumphal moments at *IHES*, resulting in unified themes in algebraic geometry, number theory, topology, category theory and complex analysis, were happening only a few decades ago in Paris. This city could contemplate mathematics growing throughout the 20th century, as this movement is flowing slightly everywhere in the world, even in other sciences, Physics, Computer Science, Biology . . .

These days in Paris, independent of your research topic, you could be sure that there is an interesting math seminar at one of the several Parisian labs or institutes; from *Collège de France* with brilliant names of exceptional professors and guests during centuries, to *Henri*

Poincaré institute which hosts hundreds of scholars per year for different math gatherings and events. I think it might be only in Paris that one morning you could decide to attend a public seminar at *Académie des sciences*; then on the way back to the metro station, ask a question to Alain Connes who is explaining to you with such a passion and modesty, how some of his results were applied to theoretical physics; and few days before, visit Christophe Pichon, researcher at Paris Institute of Astrophysics, talking with such an enthusiasm about the simulation of galaxies formation; just briefly back to the past, only 200 km away in the historical Leonardo da Vinci's residence, appreciate another scientific masterpiece on the notion of Entropy, lectured by Michael Gromov. This is mathematics in Paris at this time, rhymed beautifully with physics, computer science, biology and more applied domains, as can be seen in the daily life of Parisian research labs, or even in the media, for instance with current wave of Artificial Intelligence, supported actively by Cédric Villani. Interestingly, UNESCO has recently published the report of the COMEST working group meeting in Paris, on robotics ethics which seems to carefully follow emerging science and technology trends.

Even at home, I have the chance of hearing about other scientific figures from time to time, thanks to my husband, Omid Amini, who is a passionate math researcher. From the beginning of the time our paths have met, we enjoyed talking about unforgettable personalities in science who shared their passion of knowing with curious younger people like us. We both had the unique chance of knowing wonderful people from the east to the west of the globe with the same universal message:

*you can dream of a mind as the result of a strange miscegenation between
a logical structure and a soft spiritual passion, passion of knowing.*

I have seen this passion shining in the eyes of some unforgettable teachers and researchers I have met during my studies and academic career. My thoughts go first to some of my high school teachers, or young teachers for Math Olympiads in Iran, including Maryam Mirzakhani, who will be a model for many young scientific women not only from Iran, my home country. Later in France, when talking about geometric algorithms to my PhD supervisor, Jean-Daniel Boissonnat, until these days during our meetings with Marie-Paule Cani, on how to apply geometric analysis to simulation of virtual worlds, this passion is always present in the air. I am grateful to this life in which the passion of knowing can travel from eyes to eyes, country to country, and flows from hearts to hearts with no space, time, culture or language limitations.

There is a hidden garden, as vast as the garden of Chateau de Versailles, as beautiful as Luxembourg garden, as sacred as Sacré coeur, which smells as Monet's garden in Giverny, sounds the peaceful voice of the Seine in permanent movement, and is full of statues of strong Thinkers from everywhere in the world who meditate deep and softly, and inspire the curious mind of all the people who had the chance to hold, grow and share the passion of knowing.

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