Genomics is becoming the next significant challenge for privacy [10]. The price of a complete genome profile has plummeted below $100 for genome-wide genotyping (i.e., the characterization of about one million common genetic variants), which is offered by a number of companies. This low cost of DNA sequencing will break the physician/patient connection and can open the door to all kinds of abuse, not yet fully understood.

Access to genomic data prompts some important privacy concerns: (i) genetic diseases can be unveiled, (ii) the propensity to develop specific diseases (such as Alzheimer’s) can be revealed, (iii) a volunteer accepting de facto to have his genomic code made public can leak substantial information about genomic data of his relatives (possibly against their will), and (iv) complex privacy issues can arise if DNA analysis is used for criminal investigations and insurance purposes. Such issues could lead to abuse, threats, and genetic discrimination.

At EPFL, we have been working on different aspects of genome privacy in strong collaborations with genomic researchers and medical doctors. In particular, we focus on the following main research directions:

- Protecting and Evaluating Genome Privacy in Medical Tests and Personalized Medicine [1,2,3,4,7,9,13,14,17]
- Privacy-Preserving Processing of Raw Genomic Data [6,16]
- Quantification and Protection of Kin Genomic Privacy [5,8,10,14,15].

Collaborators: University Hospital in Lausanne (CHUV), Geneva University Hospitals (HUG), Sophia Genetics, University College London, University of California Irvine, University of Illinois at Urbana-Champaign, Indiana University Bloomington, Vanderbilt University, Cornell Tech, Saarland University, Stanford University.

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