Several factors affect today a more extended use of microarrays for research and as a diagnosis tool. These factors are the experimental cost, the reproducibility of the measurements and the format of the analyses. This project aims at bringing solutions in these three domains by optimizing multiplexed analyses in order to reduce cost and enhance the number of samples treated simultaneously; by proposing new couples fluorophores / slide surface in order to increase the signal precision and by developing new applications such as Comparative Genomic Hybridization (CGH) or Promoter Arrays to bring the plant microarray beyond transcriptome analyses. Altogether, these approaches will allow us to construct an optimized diagnostic tool based on 96 well microplate microarrays. This multidisciplinary project bring together biologists, chemists, physicists and mathematicians to develop innovative solutions for future application of DNA microarrays. The URGV team is involved in the development of the version 2 of the SAP (20k) microarray for the ChIP-Chip, multiplexing and CGH on Arabidopsis thaliana.