

TOPICS OF THE PROJECT AND WORKPLAN

- A1) Problem of 2D digital radiographies denoising: test and comparisons of first- and second-order optimization methods.
 A2) Noise components characterization in digital radiography.
 A3) Development of a general Bayesian framework for digital radiography, that includes all the different noise sources.
 B1) Comparison of the algebraic algorithms for the 3D reconstruction from projections.
 B2) Extension of the general Bayesian framework to the case of 3D reconstruction from projections.
 B3) GPU implementation of algebraic algorithms for the case of 3D reconstruction from projections.
 C) Design of test problems in digital radiography and 3D reconstruction from projections.
 D1) 2D and 3D deblurring and denoising problem formulation in both Microscopy and Astronomy.
 D2) Comparison of SGM methods against first- and second-order optimization methods.
 D3) Comparison between pyramidal filters and optimization methods for denoising problems.
 D4) Extension of pyramidal filters to the 3D case.
 D5) GPU implementation of Steerable Pyramid Transform filters.
 D6) Study of a discrepancy principle for Poissonian data.
 E) Design of test problems for 2D images in Astronomy and 3D images in Microscopy.
 F) Study of the models for the considered problems.
 G) Development and analysis of first-order methods (projected gradient).
 H) Development and analysis of second-order methods (projected Newton, interior-point Newton, quasi-Newton).
 I) Study of regularization functionals.
 J) Development of specialized algorithms and software for GPUs.
 K) Comparison of first- and second-order optimization methods.
 L) Software assessment.

	Year 1	Year 2
Milano	C, A2, B1, A1	A3, B2, B3, L
Genova	E, D1, D2, D3, D5	D1, D4, D6, L
Modena	F, A1, D2, G	G, K, J, L
Ferrara	F, A1, D2, G, H	G, H, K, L
Bologna	F, A1, H, I	H, I, L

Table 1