

Multiband Image Processing for Astronomy

LSIIT UMR CNRS 7005,
Model-Image-Vision team

Image processing team

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R. David
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Ch. Collet (PU 2001)
A. Jalobeanu (CR CNRS 2004)
M. Louys (MdC)
F. Salzenstein (MdC 2002)
Ch Wolf (MdC 2004)

F. Flitti (Doct 2002)
M. Petremand (Doct 2003)

A. Oberto (IE, 2001-2003)
J.-J. Claudon (IE 2004-2005)

A. Erchran (DEA Info, 2005)
G. Multon (ENSPS 2005)
M. Hatt (DEA Info 2004)
O. Marchal (DEA Astro 2004)
M. Petremand (DEA Info 2003)
K.-P. Maalej (DEA Astro 2003)
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Image processing team

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F. Bonnarel
A. Lançon
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Ch Pichon
C. Bot
B. Vollmer

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A. Oberto (IE, 2001-2003)
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A. Erchran (DEA Info, 2005)
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Image processing team



The image is a collage representing the work of an image processing team. It features several key elements:

- File Explorer:** A window showing a directory of files with names like 'apres_quant.k', 'parcourir.k', and 'plusieurs passa...'. The files are categorized as 'B-file' or 'ASV file'.
- Terminal/Code Editor:** A window displaying code, likely in a scripting language like MATLAB or Octave. The code includes comments in French and function calls like 'dico', 'dico_blocs', and 'disp'. Line numbers 50 through 85 are visible.
- 3D Surface Plot:** A 3D plot showing a surface with a peak, colored with a gradient from blue to yellow. A blue Greek letter λ is positioned near the peak.
- Logos and Text:** The 'ulp' logo (Université Louis Pasteur Strasbourg) and the 'LSiiT' logo are prominently displayed. A large, stylized number '6' is also visible in the bottom right.
- Background:** A faint background image of a modern building, likely a university campus.

Image processing team

Hyperspectral > 50

Superspectral $< 10, 50 >$

Multispectral < 10



λ

```
kean([0.21 0.11 0.05 0.72 0.004 2.26 0.00 0.36])
kean([0.74 0.01 0.10 0.07])
kean([0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01])
disp('kean')
time = clock;
[spuim2, imspuim2] = spuim2(kean);
time = clock;
```

```
6
end
else
    tal_cand=cand;
    dico=blocs(t,tal_cand);
end
% debut de l'algorithme
while true
    disp(sprintf('iteration %d', i));
    dico = spuim2(dico);
end
```

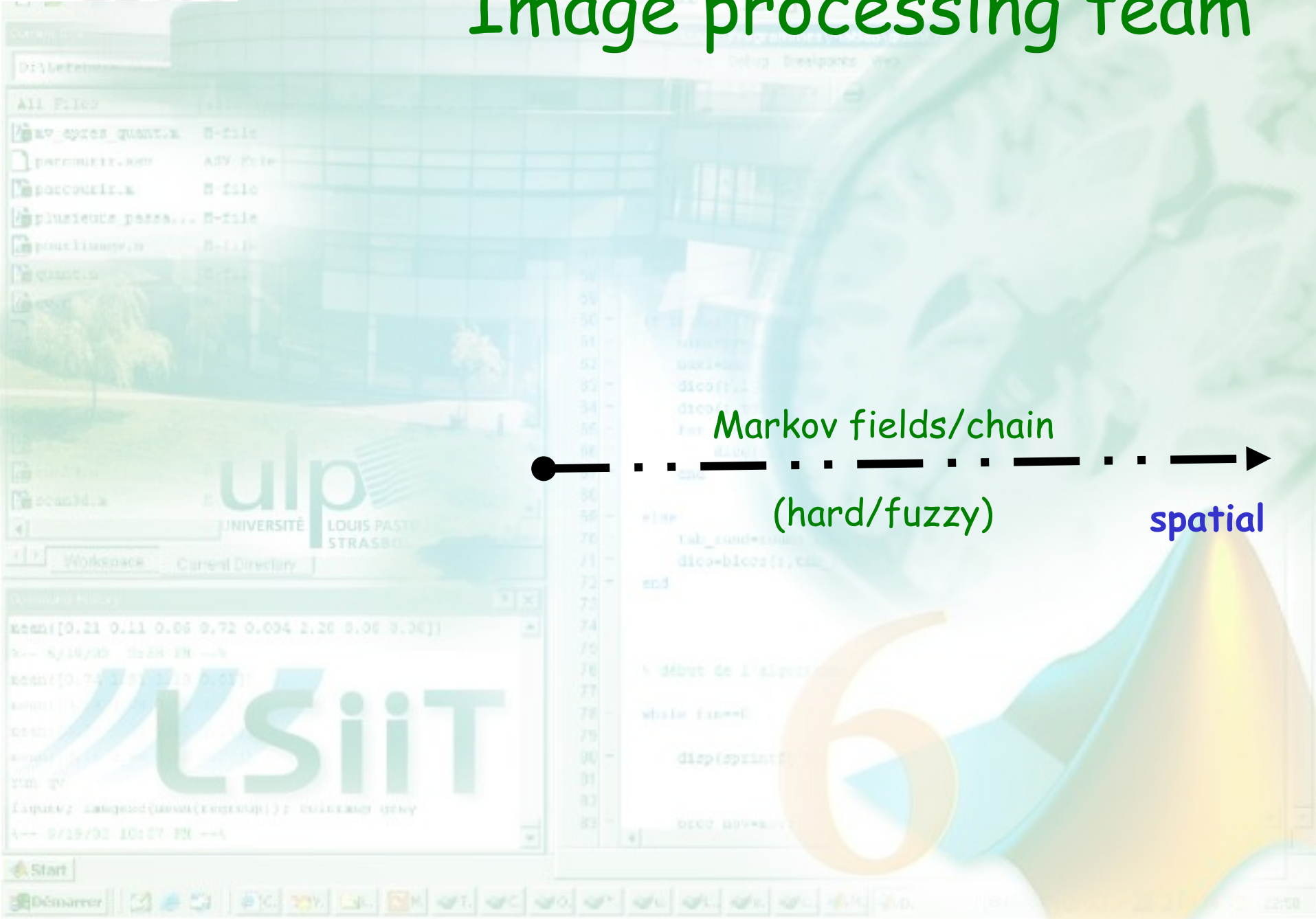
Image processing team



The image is a collage representing the work of an image processing team. It features several key elements:

- File Explorer:** A window showing a directory of files, including 'kv_apres_quant.k', 'parcourir.k', 'plusieurs passa...', 'pour l'instant', 'quant.k', and 'test'.
- Terminal:** A window displaying code, likely in a scripting language like MATLAB or Octave, with lines such as 'k=0', 'k=1', 'k=2', 'k=3', 'k=4', 'k=5', 'k=6', 'k=7', 'k=8', 'k=9', 'k=10', 'k=11', 'k=12', 'k=13', 'k=14', 'k=15', 'k=16', 'k=17', 'k=18', 'k=19', 'k=20', 'k=21', 'k=22', 'k=23', 'k=24', 'k=25', 'k=26', 'k=27', 'k=28', 'k=29', 'k=30', 'k=31', 'k=32', 'k=33', 'k=34', 'k=35', 'k=36', 'k=37', 'k=38', 'k=39', 'k=40', 'k=41', 'k=42', 'k=43', 'k=44', 'k=45', 'k=46', 'k=47', 'k=48', 'k=49', 'k=50', 'k=51', 'k=52', 'k=53', 'k=54', 'k=55', 'k=56', 'k=57', 'k=58', 'k=59', 'k=60', 'k=61', 'k=62', 'k=63', 'k=64', 'k=65', 'k=66', 'k=67', 'k=68', 'k=69', 'k=70', 'k=71', 'k=72', 'k=73', 'k=74', 'k=75', 'k=76', 'k=77', 'k=78', 'k=79', 'k=80', 'k=81', 'k=82', 'k=83', 'k=84', 'k=85', 'k=86', 'k=87', 'k=88', 'k=89', 'k=90', 'k=91', 'k=92', 'k=93', 'k=94', 'k=95', 'k=96', 'k=97', 'k=98', 'k=99', 'k=100'.
- Brain Scan:** A large, semi-transparent image of a brain scan, likely an MRI or CT scan, showing internal structures.
- 3D Bar Chart:** A 3D bar chart with a color gradient from blue to yellow, showing a series of bars of varying heights.
- LSiiT Logo:** The logo for the team, featuring the letters 'LSiiT' in a stylized font.
- Navigation:** A dashed arrow pointing right, with the word 'spatial' written in blue below it.

Image processing team



Markov fields/chain

(hard/fuzzy)

spatial

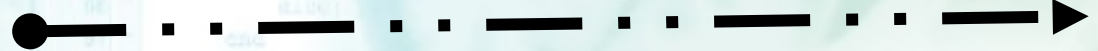


Image processing team



The background image shows a computer interface with a file explorer, a code editor, and a terminal window. The interface is overlaid on a background image of a building and a brain scan. A large number '6' is visible in the bottom right corner.

The file explorer shows a list of files:

- av_apres_quant.k B-file
- parcourir.k ASV file
- parcourir.k B-file
- plusieurs passa... B-file
- pour l'instant B-file
- quant.k B-file
- test

The code editor shows the following code:

```
58  
59  
60  
61  
62  
63 dico(t,  
64 dico(t,  
65 for el=2  
66 dico)  
67  
68  
69  
70 else  
71 tab_cand=cand  
72 dico=blocs(t,tab  
73 end  
74  
75  
76 % debut de l'algorithme  
77  
78 while true==0  
79  
80 disp(sprintf(  
81  
82  
83 dico supprime
```

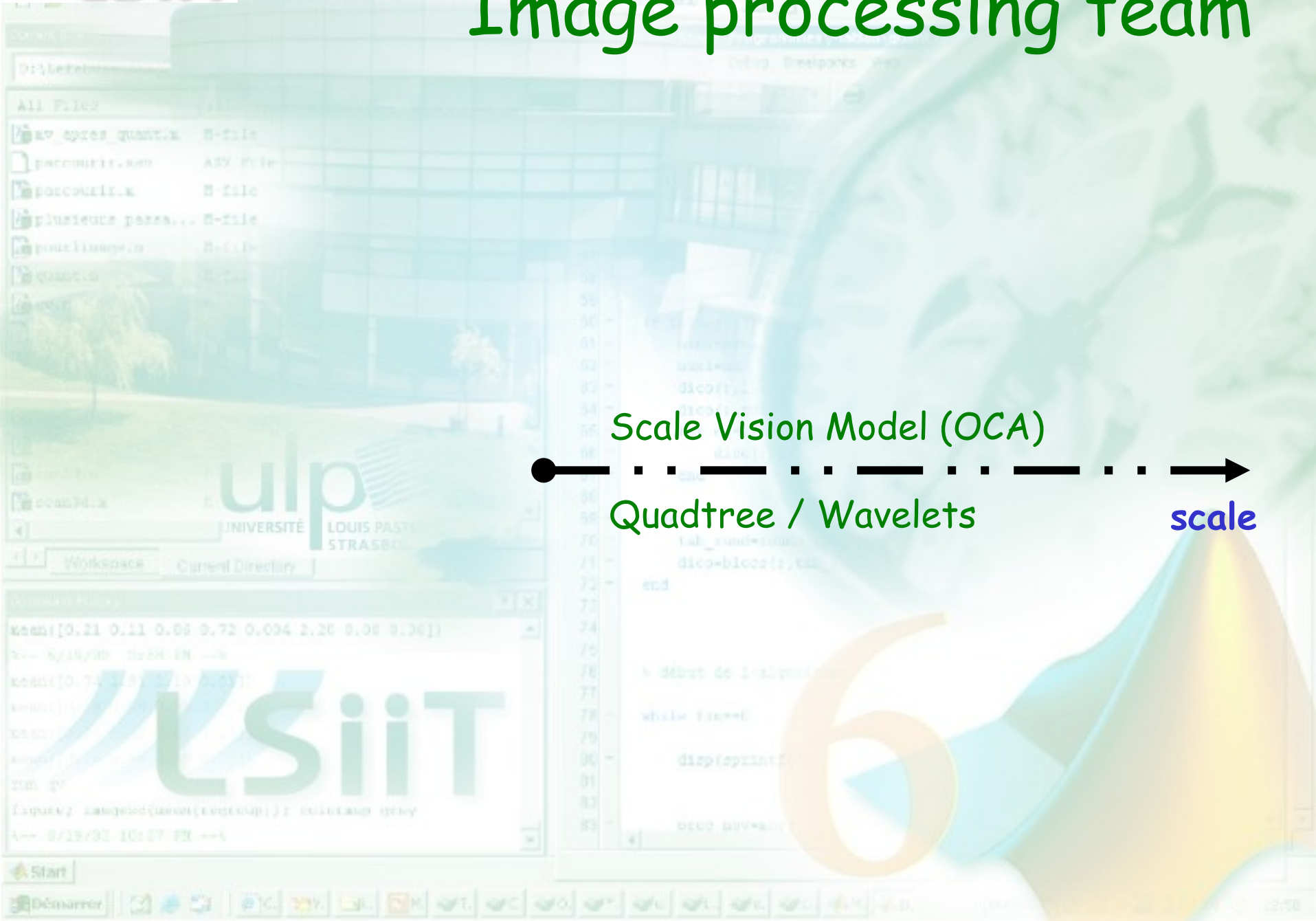
The terminal window shows the following output:

```
kean([0.21 0.11 0.05 0.72 0.004 2.26 0.06 0.36])  
k-- 8/19/02 10:07 PM --  
kean([0.74 0.01 0.10 0.07])  
kean([  
dico(  
kean(  
im_gv  
[input%2: %input%2(%input%2)]: %input%2 %input%2  
A-- 8/19/02 10:07 PM --
```

The terminal window also shows the LSiiT logo.

A dashed arrow points from the code editor to the right, with the word "scale" written below it.

Image processing team



Scale Vision Model (OCA)

Quadtrees / Wavelets

scale



Image processing team



Image processing team

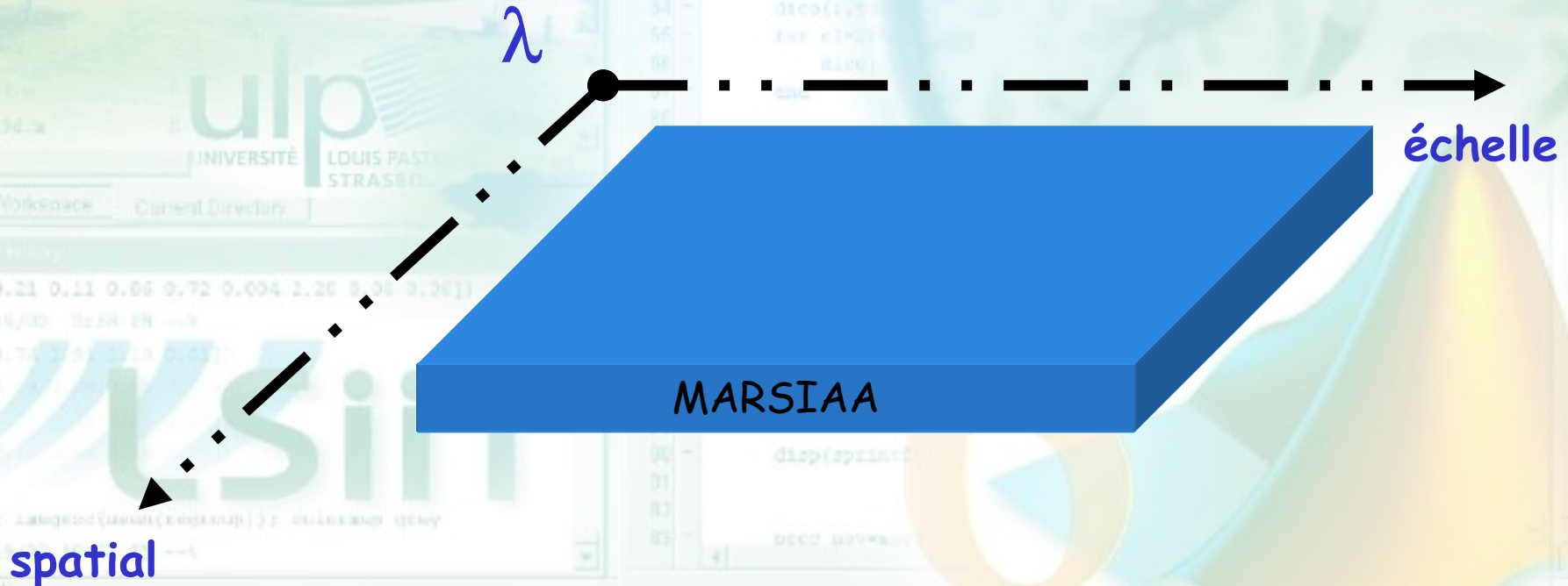


Image processing team

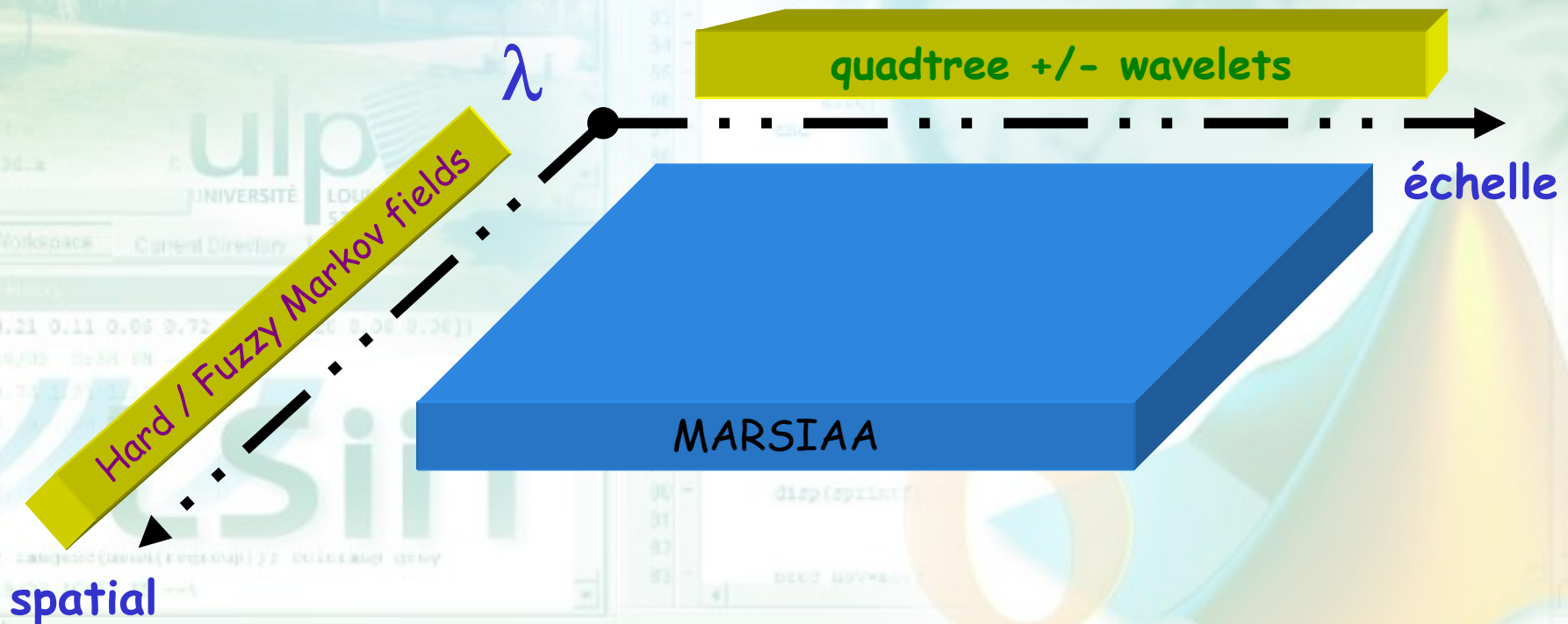


Image processing team

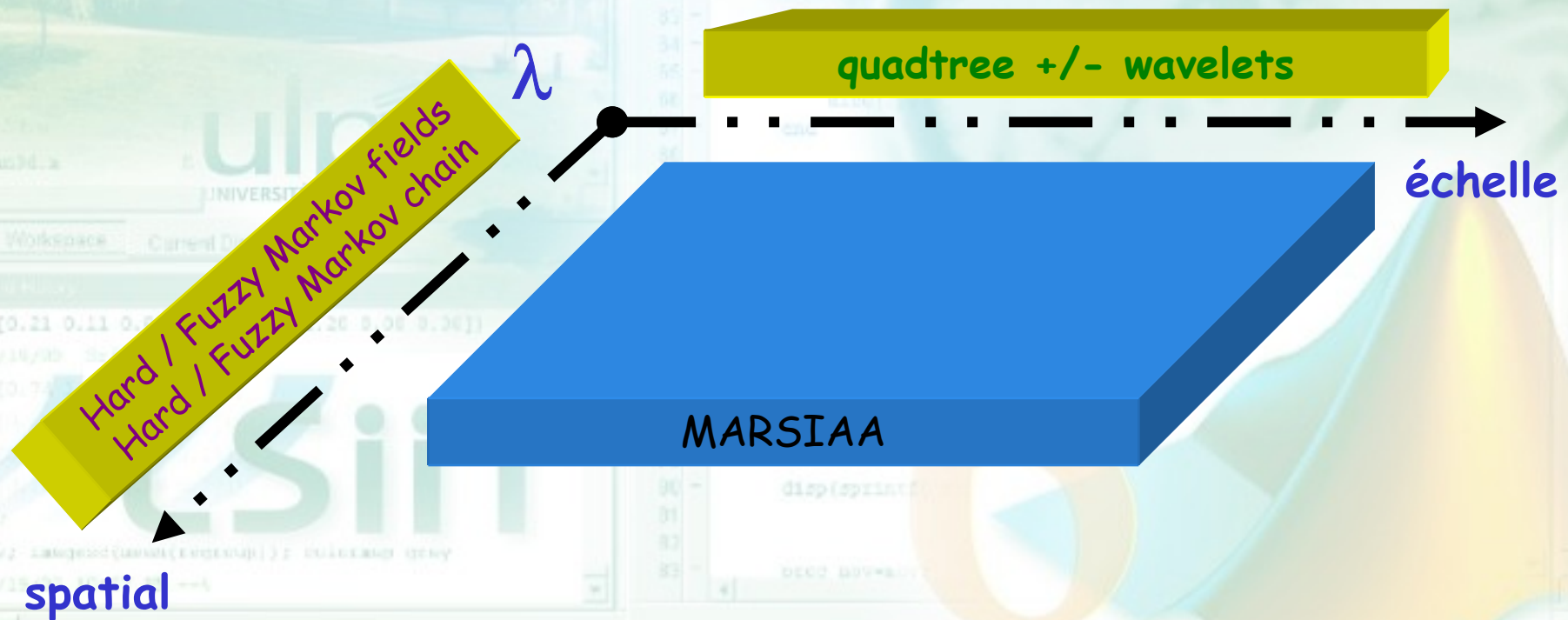


Image processing team

Data reduction
PCA, ICA, Projection pursuit

quadtree +/- wavelets

échelle

MARSIAA

Hard / FUZZY Markov fields
Hard / FUZZY Markov chain

spatial

λ

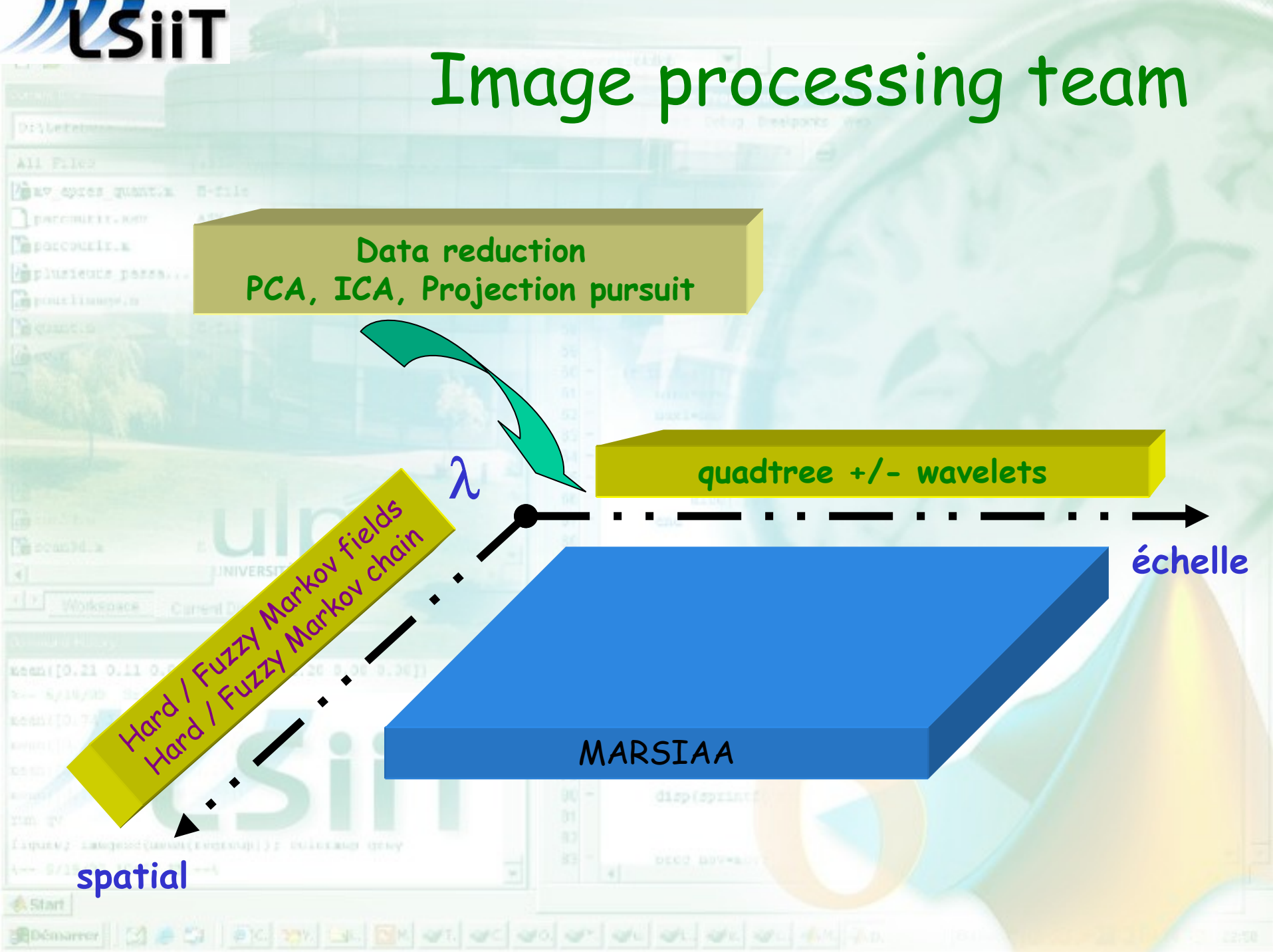
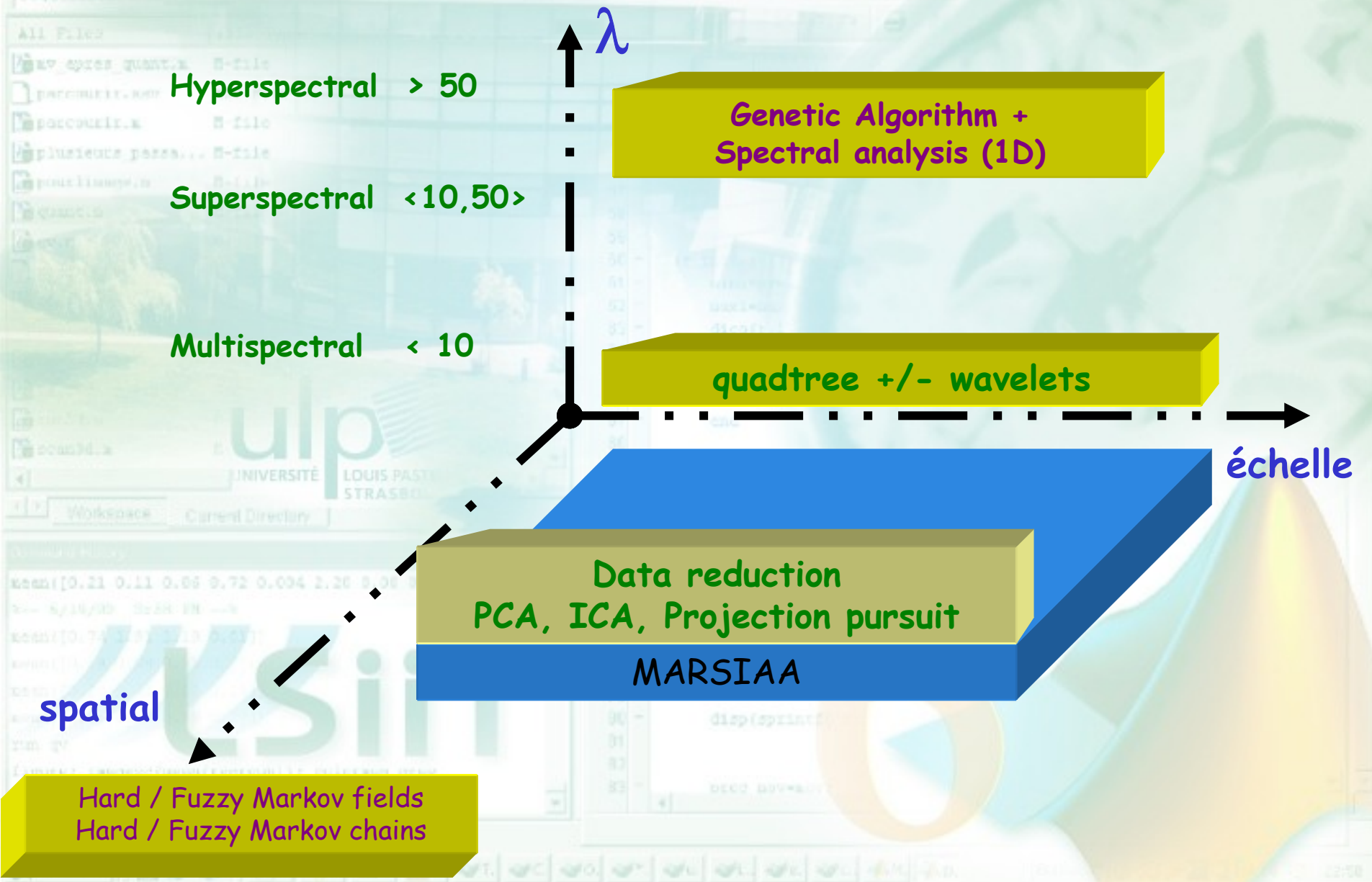
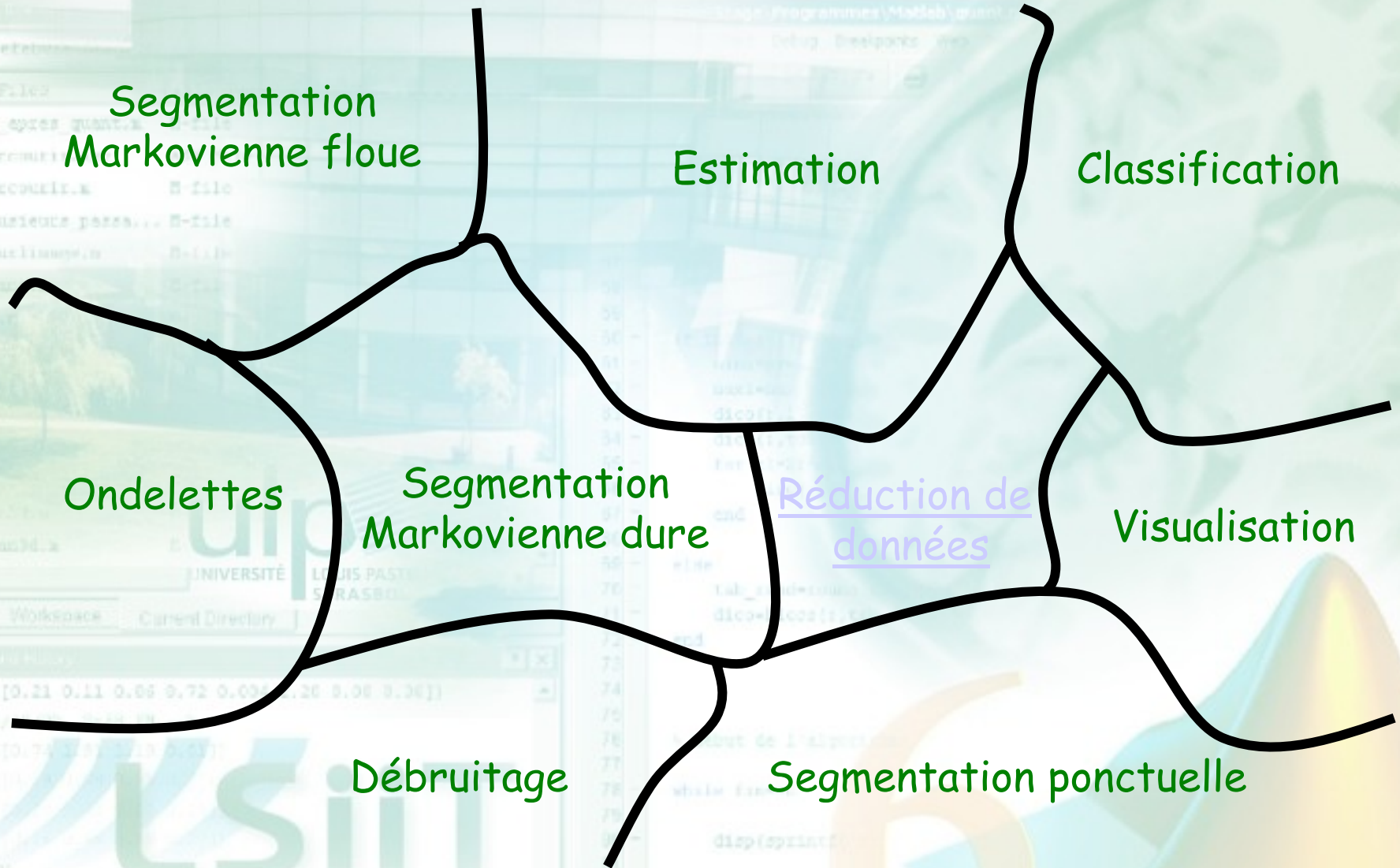


Image processing team





Segmentation
Markovienne floue

Estimation

Classification

Ondelettes

Segmentation
Markovienne dure

Réduction de
données

Visualisation

Débruitage

Segmentation ponctuelle