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61 years old,
Senior lecturer (Informatics and signal processing).

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PROFESSIONAL ACTIVITIES:

Research activities:

BIOTICla Team, ANTICIPE UMR 1086 (INSERM), Cancer research center (François Baclesse), 3 avenue général Harris 14076 Caen Cedex 05, France.

- Linear analysis and nonlinear analysis on the classical bases (Fourier, Cosine and so on) and on the wavelet bases (*).
- Quality control using stereology test grids to evaluate several pathology index (*).
- Image processing of the large virtual slides (WSI) in histology and cytology (*).

(*) latest publications listed in Annex 1.

Teaching activities:

University institute of technology, Department of “Mesures Physiques”, Boulevard du Maréchal Juin, 14032 Caen Cedex, France.

- Informatics: C language, JAVA language, MATLAB language (practical works, tutorials).
- Signal processing (courses, practical works, tutorials).
- Geometrical optics and wave optics. (courses, practical works, tutorials).

EDUCATION:

1995 - 1998	Thesis (PhD) of signal processing and image processing: "Applying the curvilinear Fourier transform to the object detection"	Abstract in <u>Annex 2</u> .
1982 - 1983	D.E.A.: "Instrumentation and measurements"	Equivalent to the master two degree.
1978 - 1981	Engineering degree – E.N.S.I. of Caen (E.E.A.I.).	Specialties: <ul style="list-style-type: none"> • Electronics; • Electromechanics; • Automatics; • Informatics.

Annex 1:

2010-1 Signolle N., Revenu M., Plancoulaïne B., Herlin P. Wavelet-based multiscale

- texture segmentation: Application to stromal compartment characterization on virtual slides. *Signal Processing; Special Section on Processing and Analysis of High-Dimensional Masses of Image and Signal Data*, 2010, 90(8):2412-2422.
- 2011-1 Fafin-Lefevre M., Morlais F., Guittet L., Clin B., Launoy G., Galateau-Sallé F., Plancoulaine B., Herlin P., Letourneux M. Nuclear Morphology for the Detection of Alterations in Bronchial Cells from Lung Cancer: An Attempt to Improve Sensitivity and Specificity. *Analytical and Quantitative Cytology and Histology*, 2011; 33(4):183:195.
- 2011-2 Belhomme P., Oger M., Michels JJ., Plancoulaine B., Herlin P., Towards a computer aided diagnosis system dedicated to virtual microscopy based on stereology sampling and diffusion maps. *Diagnostic Pathology* 2011; 6 (Suppl 1).
- 2011-3 Laurinavicius A., Laurinaviciene A., Dasevicius D., Elie N., Plancoulaine B., Bor C., Herlin P. Digital image analysis in pathology: benefits and obligation. *Anal Cell Pathol (Amst)*, 2012;35(2):75-78.
- 2012-1 Plancoulaine B., Herlin P., Oger M., Elie N., Brécin M., Marnay J., Nasri A., Bor-Angelier C., Construction d'une lame virtuelle composite à partir d'échantillons tissulaires jointifs, *Annales de Pathologie*, 2012;32(5):146-147.
- 2013-1. Belhomme P., Oger M., Michels JJ., Plancoulaine B., Out-of-sample extension of diffusion maps in a computer aided diagnosis system. Application to breast cancer virtual slide images. *Diagnostic Pathology* 2013; 8(Suppl 1).
- 2013-2. Oger M., Allaoui M., Elie N., Marnay J., Herlin P, Plancoulaine B., Chasle J., Becette V., Bor-Angelier C., Impact of tumor heterogeneity on disease-free survival in a series of 368 patients treated for a breast cancer, *Diagnostic Pathology*, 2013; 8(Suppl 1).
- 2013-3. Balsat C., Signolle N., Goffin F., Delbecque K., Plancoulaine B., Sauthier P., Samouëlian V., Béliard A., Munaut C., Foidart J.M., Blacher S., Noël A. and Kridelka F., Improved computer-assisted analysis of the global lymphatic network in human cervical tissues, *Modern Pathology*, 2013, 1-12.
- 2013-4. Laurinavicius A., Plancoulaine B., Laurinaviciene A., Herlin P., Meskauskas R., Baltrusaityte I., Besusparis J., Elie N., Belhomme P., Iqbal Y., Bor-Angelier C., A methodology to ensure and improve accuracy of Ki67 digital immunohistochemistry analysis in breast cancer tissue, *Molecular Cancer Research* 2013; 11(10 Supplement):B116.
- 2014-1. Toralba S., Landemore G., Coquemont M., Plancoulaine B., Chapon F., Cavernous malformations of the human brainstem: three-dimensional reconstruction from stained and stacked histological slides using computerized techniques, *Histology and histopathology*, 2014, 29.
- 2014-2. Laurinavicius A., Plancoulaine B., Laurinaviciene A., Herlin P., Meskauskas R., Baltrusaityte I., Besusparis J, Dasevicius D., Elie N., Iqbal Y., Bor C., Ellis I.O, A methodology to ensure and improve accuracy of Ki67 labelling index estimation by automated digital image analysis in breast cancer tissue. *Breast cancer research* 2014; 16(2).
- 2014-3. Daunoravicius D., Besusparis J, Zurauskas E., Laurinaviciene A, Bironaite D., Pankuweit S., Plancoulaine B., Herlin P., Bogomolovas J., Grabauskiene V., Laurinavicius A., Quantification of myocardial fibrosis by digital image analysis and interactive stereology, *Diagnostic Pathology* 2014, 9:114.
- 2014-4. Plancoulaine B., Oger M., Elie N., Belhomme P., Herlin P., Nasri A., Augé C.,

- Brécin M., Marnay J., Bor-Angelier C., Building of a composite virtual slide from contiguous tissue samples. *Diagnostic Pathology* 2014, 9(Suppl 1):S9.
- 2014-5. Plancoulaine B., Laurinaviciene A., Meskauskas R., Baltrusaityte I., Besusparis J., Herlin P., Laurinavicius A., Digital immunohistochemistry wizard: image analysis-assisted stereology tool to produce reference data set for calibration and quality control. *Diagnostic Pathology* 2014, 9(Suppl 1):S8.
- 2014-6. Laurinaviciene A., Plancoulaine B., Baltrusaityte I., Meskauskas R., Besusparis J., Lesciute-Krilaviciene D., Raudeliunas D., Iqbal Y., Herlin P., Laurinavicius A., Digital immunohistochemistry platform for the staining variation monitoring based on integration of image and statistical analyses with laboratory information system. *Diagnostic Pathology* 2014, 9(Suppl 1):S10.
- 2014-7. Belhomme P., Toralba Simon, Plancoulaine B., Oger M., Gurcan M., Bor-Angelier, Heterogeneity assessment of histological tissue sections in whole slide images. *Computerized Medical Imaging and Graphics*, 2014, 11:006.
- 2014-8. Besusparis J., Jokubauskiene S., Plancoulaine B., Herlin P, Laurinaviciene A., Buivydiene A., Laurinavicius A., Quantification Accuracy of Liver Fibrosis by In Vivo Elastography and Digital Image Analysis of Liver Biopsy Histochemistry, *Analytical Cellular Pathology*, 2014, Volume 2014, Article ID 317635.
- 2015-1. Plancoulaine B., Laurinaviciene A., Herlin P., Besusparis J., Meskauskas R., Baltrusaityte I., Iqbal Y, Laurinavicius A., methodology for comprehensive breast cancer Ki67 labeling index with intra-tumor heterogeneity appraisal based on hexagonal tiling of digital image analysis data, *Virchows Archiv*, 2015, 467(6): 711-722.
- 2016-1. Laurinavicius A., Plancoulaine B., Rasmusson A., Augulis R., Besusparis J., Meskauskas R., Herlin P., Laurinaviciene A., Abdelhadi Muftah A., Abdelaziz I., Aleskandarany M., Green AR., Ellis I, Bimodality of intratumor Ki67 expression is an independent predictor of overall survival of patients with invasive breast carcinoma, *Virchows Archiv* 2016, 468(4), 493-502.
- 2016-2. Laurinavicius A., Plancoulaine B., Herlin P., Laurinaviciene A., Comprehensive immunohistochemistry: digital, analytical and integrated, *Pathobiology*, 2016; 83(2-3):156-163.
- 2016-3. Besusparis J., Plancoulaine B., Rasmusson A., Augulis R., Green A., Ellis I., Laurinaviciene A., Herlin P., Laurinavicius A., Impact of tissue sampling on accuracy of Ki67 immunohistochemistry evaluation in breast cancer, *Diagnostic Pathology*, 2016, 11:82.
- 2017-1. Ben Cheikh B., Elie N., Plancoulaine B., Bor-Angelier C., Racoceanu D., A morphological model of tumor-immune system interaction, 2017, *Biomedical Imaging (ISBI'17)* (In press).
- 2017-2. Labbé C, Plancoulaine B., Optical matrix applied to the centered systems, *Techniques de l'ingénieur*, 2017, E8250, (French language).

Annex 2:

The present techniques of automatic image processing are being used in various fields, ranging from biology to materials, from astronomy to electronics. These techniques require swifter and swifter algorithms in order to allow their daily use on production “lines” in medical or industrial environment. The present work fits into this framework. Object identification is part of these general methods apt to process images and is applicable to many tests.

Among the various principles and methods of object identification which are being recalled here, we particularly focused on the description and criticism of automatic sorting methods. First, we shall recall the notion of modulo algebra on polynomial systems, in order to introduce the semi-global analysis method based on the curvilinear Fourier transformation, better fitted for the constraints of numerisation and of image sampling. Second, we shall give the results of the "RECOB" software which is developed for the identification of objects by Fourier transformation and established to appraise various object recognition methods. As an example, we have used it for two types of biomedical tests : the sorting of human spermatozoïds, allowing to appraise the quality of sperm in a sterility evaluation, and the sorting of cell nuclei with both normal and abnormal morphology, thus allowing to work out a purged graph of the DNA content, this, only on tumour cells. Medical researchers regard these results as full of promises.

The above mentioned techniques have been set up inside the "Pôle Traitement Analyse d'Images de Basse Normandie" which regroups several research teams who develop image identification methods applied to various fields, such as biomedical, metallurgical, ceramurgical and geographical ones.