



## Post-doctoral fellowship Deep learning for multimodal imaging and oncology applications

### 1. Scientific framework

Our group investigates the design and validation of predictive models exploiting multi-modal imaging (radiomics) and other -omics data for diagnosis and therapy response evaluation in oncology, and radiotherapy planning. These investigations are associated with numerous challenges to address and pitfalls to avoid [1]. Recently deep learning techniques have emerged as promising tools in several fields [2], including medical image segmentation [3] and radiomics [4].

### 2. Job description and missions

The post-doc will be in charge of investigating the use of machine learning methods and more specifically deep learning and transfer learning approaches to address the various challenges in the development of multiparametric models in oncology. The main objective will be to carry out such developments (multimodal image segmentation, characterization of images' content, learning from databases to build predictive/prognostic models, etc.) up to their validation in clinical applications. The post-doc will also co-supervise PhD students and contribute to the overall scientific project of the research group.

### 3. Profile

We look for a candidate with a PhD in applied mathematics, computer sciences and/or machine learning/computer vision, with expertise in medical imaging related applications. Priority will be given to candidates with demonstrated expertise and skills related to machine learning and radiomics. Good scientific programming skills and an experience in managing medical imaging projects are an important requisite. Demonstration of the ability to publish in high ranking journals of the field will be scrutinized. Autonomy, open-mindedness and motivation, as well as good English speaking/writing skills, are also expected.

### 4. Position context

The candidate will join the [Laboratory of Medical Information Processing](#) (LaTIM, INSERM UMR 1101, Brest, France), in the team "ACTION" (therapeutic action guided by imaging in oncology), led by Dimitris Visvikis (director of research, INSERM), and under the supervision of [Mathieu Hatt](#) (research associate, INSERM) in the « Multiparametric modeling and analysis » group. The team develops numerous collaborations with other groups in France, Europe and worldwide that will facilitate the developments and their clinical validation.

The contract will be for an initial duration of one year and renewable up to three years. Monthly net salary between ~2050€ and 3090€ depending on post-PhD experience.

### 5. Contact and additional information

The position will be open starting November 2016 and should be filled not later than February 2017.

Send a CV, a motivation letter, the description of the thesis, a list of publications, as well as letters of recommendation and work references, to: [dimitris@univ-brest.fr](mailto:dimitris@univ-brest.fr) and [hatt@univ-brest.fr](mailto:hatt@univ-brest.fr). Please read carefully the profile (section 3) before sending your application.

### 6. References

- [1] M. Hatt, F. Tixier, L. Pierce, P. E. Kinahan, C. C. Le Rest, and D. Visvikis, "Characterization of PET/CT images using texture analysis: the past, the present... any future?," *Eur. J. Nucl. Med. Mol. Imaging*, Jun. 2016.
- [2] Y. LeCun, Y. Bengio, and G. Hinton, "Deep learning," *Nature*, vol. 521, no. 7553, pp. 436–444, mai 2015.
- [3] M. Havaei, A. Davy, D. Warde-Farley, A. Biard, A. Courville, Y. Bengio, C. Pal, P.-M. Jodoin, and H. Larochelle, "Brain tumor segmentation with Deep Neural Networks," *Med. Image Anal.*, vol. 35, pp. 18–31, May 2016.
- [4] P.-P. Ypsilantis, M. Siddique, H.-M. Sohn, A. Davies, G. Cook, V. Goh, and G. Montana, "Predicting Response to Neoadjuvant Chemotherapy with PET Imaging Using Convolutional Neural Networks," *PLoS One*, vol. 10, no. 9, p. e0137036, 2015.