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# Bruno Mendes

## Medical Physicist

### Experience

11-11-2014–  
Now **Medical Physicist (Clinical Scientist) and Researcher**, *Instituto Português de Oncologia do Porto Francisco Gentil (IPO-PORTO)*

- Implemented regular quality control procedures on 15 radiology equipment (CT, conventional radiology, fluoroscopy and angiography) and 9 linear accelerators
- Performed daily patient-specific quality assurance procedures for radiotherapy treatment plans
- Headed the weekly MLC verification and monthly verifications of a CLINAC DHX system
- Designed a personal dosimetry management system for over 400 professionals with VBA in Excel
- Developed 2 Web-apps (Django - Python + SQLite3), one for daily dose rate monitoring of LINACs (graphical plotting of input values) and another as an internal inventory tracking system (barcodes) for 100 personal x-ray protective equipment
- Created an open-source deep inspiration tracking system using a webcam and OpenCv, reducing to zero the cost of implementation
- Supervised 3 Master's Theses from FCUP and ISEP supporting with python coding insights, data analysis, visualization and article writing

16-01-2014–  
11-11-2014 **Medical Physics Intern**, *Instituto Português de Oncologia do Porto Francisco Gentil (IPO-PORTO)*

- Performed annual quality control procedures on fluoroscopy, mammography and CT equipment at IPO-Porto, supervised by a Medical Physics Expert
- Optimized adult and pediatric CT protocols by adjusting automatic tube current modulation parameters reducing the dose to patients by about 20%
- Developed python scripts to extract DICOM tags from medical images (Big Data) and conducted computations, analyses and visualizations
- Collaborated in the logistics of personal dosimetry of 400 controlled professionals at the institution

2005–2007 **Museum Guide**, *Museum of Santa Maria de Lamas*, Cork Museum

- Provided information about exhibits
- Conducted guided tours to groups up to 100 visitors
- Participated in the organization of 2 workshops at the museum
- Managed visiting hours and appointments

### Education

2020–Now **Doctorate in Biomedical Engineering**, *Faculdade de Engenharia da Universidade do Porto (FEUP)*

- Studied and evaluated feature extraction, selection, model building methods and classification pipelines
- Developed a U-Net for multi-class semantic segmentation of the prostate, bladder and rectum
- Predicted prostate cancer aggressiveness using CT and CBCT images

2011–2013 **Master in Medical Physics**, *Faculdade de Ciências da Universidade do Porto (FCUP)*

- *Narrow-Band Image Processing for Gastroenterological Examinations*, supervised by Ricardo Sousa (IT) and Carla Rosa (INES TEC and FCUP). Developed a framework for the classification of Barrett's oesophagus using DSIFT descriptors, Bag of words and SVM.

2007–2011 **Degree in Physics**, *FCUP*

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## Languages

Portuguese Native  
English C1

*Understanding, speaking and writing*

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## Computer skills

Web	Django, JavaScript, HTML, CSS	Learning	Scikit-learn, PyTorch
Data	Pandas, Numpy	Images	OpenCV, Scikit-image
Visualization	Matplotlib, Seaborn	Medical	VTK, ITK, PyDicom
Documents	L <sup>A</sup> T <sub>E</sub> X	Spreadsheet	VBA

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## Publications

- [1] Bruno Mendes, Inês Domingues, and João Santos. “Multi-class Semantic Segmentation for Prostate Cancer Radiotherapy Treatment Optimization”. In: *International Conference on Mathematical Analysis and Applications in Science and Engineering (ICMA<sup>2</sup>SC'22)*. 2022.
- [2] Bruno Mendes, Inês Domingues, and João Santos. “CT Radiomic Features for a Prostate Cancer Evaluation Framework”. In: *Portuguese Conference on Pattern Recognition (RecPad)*. 2021.
- [3] Bruno Mendes, Inês Domingues, and João Santos. “Radiomic Features for a Prostate Cancer Evaluation Framework”. In: *4th Doctoral Congress in Engineering (DCE), Symposium on Biomedical Engineering*. 2021, pp. 33–35.
- [4] Bruno Mendes et al. “Prostate Cancer Aggressiveness Prediction Using CT Images”. In: *Life* 11.11 (2021), p. 1164.
- [5] Sandra Sarmiento, Bruno Mendes, and Margarida Gouvêa. “Automatic calculation of patient size metrics in computed tomography: What level of computational accuracy do we need?” In: *Journal of Applied Clinical Medical Physics* 19.1 (2018), pp. 218–227.
- [6] Ana Ribeiro, Bruno Mendes, and Sandra Sarmiento. “Variability of mammographic exam doses as a result of positioning and technique”. In: *Physica Medica* 52 (2018). Abstracts from the 2nd European Congress of Medical Physics, pp. 109–110.
- [7] J. Amorim et al. “Image processing as a potential tool for CT dose optimization”. In: *Physica Medica* 32 (2016). Abstracts from the 1st European Congress of Medical Physics, p. 316.
- [8] S. Sarmiento, B. Mendes, and M. Gouvêa. “The advantages of using average attenuation metrics to express patient size in computed tomography dose optimization”. In: *Physica Medica* 32 (2016). Abstracts from the 1st European Congress of Medical Physics, pp. 314–315.
- [9] J. Pereira et al. “Patient surface and isocenter dose in FLUORO-CT”. In: *Physica Medica* 32 (2016). Abstracts from the 1st European Congress of Medical Physics, p. 329.
- [10] B. Mendes et al. “Assessing the feasibility of simulating different tube current limits in noise oriented ATCM systems”. In: *Physica Medica* 32 (2016). Abstracts from the 1st European Congress of Medical Physics, p. 311.
- [11] Bruno Mendes et al. “Colour Invariant Features for Narrow – Band Imaging in Gastroenterological Examinations”. In: *Portuguese Conference on Pattern Recognition (RecPad)*. 2013.

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## Presentations

09-09-2022 **Conferência Nacional de Física, FCUP, Porto**  
27-06-2022 **The International Conference on Mathematical Analysis and Applications in Science and Engineering (ICMA<sup>2</sup>SC'22), ISEP, Porto**  
29-06-2021 **Doctoral Congress in Engineering (DCE), FEUP, Porto**