Raluca-Maria **Sandu**

Researcher · Data Scientist

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About Me

I am a perseverant and resourceful scientific professional who just finished their PhD Degree in Biomedical Engineering at the University of Bern, previously having graduated with an MSc in the same field, and a BSc in Control Engineering and Applied Computer Science. I am specialized in working on data science and research & development projects across various topics as evidenced by my work experience and studies.

Work Experience

University of Bern, ARTORG Center for Biomedical Engineering Research — *Bern, Switzerland*

Doctoral candidate (PhD) — *May 2017 - Feb. 2021*

- Worked with data mining, image processing & registration, radiomics & feature extraction, statistics, and machine learning algorithms in the area of CT-guided ablation treatments for liver cancer by using Python and R programming languages.
- Developed a quantitative and numerical evaluation method based on DICOM image segmentations for assessing the success of liver ablation treatments which was published in a peer-reviewed journal. More info **here**.

Philips Research, Personal Care and Wellness — *Eindhoven, The Netherlands*

Research and Development Graduate Student — *Jul. 2016 - Mar. 2017*

- Designed and developed a web-based application for image annotation using JavaScript, HTML and CSS that can be found **here**.
- Applied image processing and machine learning algorithms in Python (SVM, PCA, Random Forests) for classification of skin surface structures.

Philips Research, Personal Care and Wellness — *Eindhoven, The Netherlands*

Research and Development Internship — *Apr. 2016 - Jun. 2016*

- Contributed with exploratory 2D image analysis in Python to quantify the effect of various diets on physical appearance at skin surface.

RWTH Aachen, Joint Research Centre for Computational Biomedicine — *Aachen, Germany*

Student Research Assistant — *Nov. 2014 - Jul. 2015*

- Carried out exploratory data analysis in MATLAB to study interactions between cancer cell lines.

Philips Research, Personal Health — *Eindhoven, The Netherlands*

Research and Development Internship — *Jul. 2013 - Oct. 2013*

- Explored in MATLAB the feasibility of a device to diagnose lung diseases by employing signal processing and machine learning algorithms.

Philips Research, Personal Health — *Eindhoven, The Netherlands*

Research and Development Internship — *Jul. 2012 - Sep. 2012*

- Implemented data mining and statistics in MATLAB to analyze the physiological signals of chronic heart failure patients.

Education

University of Bern, ARTORG Center for Biomedical Engineering Research — *Bern, Switzerland*

PhD in Biomedical Engineering — *May 2017 - Feb. 2021*

- Thesis: “Quantitative assessment of ablation treatments for liver tumours – image-based efficacy analysis and predictive modelling”.
- PhD project part of a Marie Skłodowska-Curie ITN grant aimed at improving soft tissue clinical treatments.
- Thesis supervisor: Prof. Dr. Raphael Sznitman.

RWTH Aachen University, Faculty of Medicine — *Aachen, Germany*

MSc in Biomedical Engineering — *Oct. 2014 - Apr. 2017*

- Thesis: “Image Segmentation and Semantic Description: Tools and Analytics” carried out at Philips Research Eindhoven.
- Thesis Project Grade: 100%. GPA: 83%.

Politehnica University of Bucharest, Faculty of Automatic Control and Computers — *Bucharest, Romania*

BSc in Control Engineering and Applied Computer Science — *Oct. 2010 - Jul. 2014*

- Thesis: ”Volumetric Capnography Respiratory Signals for Spontaneously Breathing Subjects” carried out at Philips Research Eindhoven.
- Thesis Project Grade: 98%. GPA: 83%.

IT& Technical Skills

Strong	**Python.** Numpy, scikit-learn, scipy, pydicom, pyradiomics, simpleitk, pandas, opencv, matplotlib, seaborn.
	Machine Learning. PCA, SVM, decision trees, random forests, k-means, regression, cross-validation, ROC, F-score.
	Version Control. Git, GitHub, Bitbucket (Jira + Confluence), Sourcetree.
Knowledgeable	**Deep Learning.** TensorFlow, PyTorch, Keras (Coursera and Udemy Studies).
	R Programming. Statistics and data manipulation: lsmeans, lme4, ggplot2, tidyverse.
	MATLAB. Data, signal and image processing.
	C/C++/C#. Object-Oriented Programming (OOP).
	Database Design. SQL, ER model, normalisation. MySQL, PostgreSQL, PHP.
	Web Design. Django, JavaScript, HTML, CSS, JSON, Markdown, Hugo.

Languages

C1	**English.** Certificate in Advanced English (CAE), University of Cambridge ESOL, Grade A (100%) (2009).
B2	**German.** Completed B2.2. German Language Course at University of Bern (2017-2019).
B1	**French.** Diplôme d'études en langue française DELF B1, Grade 80% (2009).

Extracurricular Activities

Volunteering	Vice-President at **IAESTE**. Organizing local events for visiting interns and promoting available internships and workshops.
Hobbies	Skiing, Snowboarding, Hiking, Surfing, Yoga, Painting.

Publications

Peer-Reviewed Articles

[1] Volumetric Quantitative Ablation Margins for Assessment of Ablation Completeness in Thermal Ablation of Liver Tumours
R.-M. Sandu, I. Paolucci, S. J. S. Ruiter, R. Sznitman, K. P. de Jong, J. Freedman, S. Weber, and P. Tinguely
Frontiers in Oncology, vol. 11, 2021
DOI: 10.3389/fonc.2021.623098

[2] Accuracy of Electrode Placement in IRE Treatment with Navigated Guidance
D. Stillström, **R.-M. Sandu**, and J. Freedman
CardioVascular and Interventional Radiology, 2021
DOI: 10.1007/s00270-020-02762-5

[3] Ultrasound based planning and navigation for non anatomical liver resections — an ex-vivo study
I. Paolucci, **R.-M. Sandu**, L. Sahli, G. A. Prevost, F. Storni, D. Candinas, S. Weber, and A. Lachenmayer
IEEE Open Journal of Engineering in Medicine and Biology, 2019
DOI: 10.1109/OJEMB.2019.2961094

Conference Proceedings

[1] Quantitative volumetric assessment of percutaneous image-guided microwave ablations for colorectal liver metastases
R.-M. Sandu, I. Paolucci, J. Freedman, P. Tinguely, S. J. S. Ruiter, and S. Weber
31st Conference of the International Society for Medical Innovation and Technology (iSMIT), 2019, Heilbronn, Germany

[2] Quantitative Volumetric Assessment of CT-guided Ablation Treatments for Colorectal Liver Metastases
R.-M. Sandu, I. Paolucci, J. Freedman, P. Tinguely, and S. Weber
IEEE Engineering in Medicine and Biology Society (EMBS) International Student Conference (ISC), 2019, Magdeburg, Germany

[3] Quantitative volumetric assessment of percutaneous image-guided microwave ablations for colorectal liver metastases
R.-M. Sandu, I. Paolucci, J. Freedman, and S. Weber
CURAC, 18th Annual Meeting of the German Society for Computer and Robot-Assisted Surgery, 2019, Reutligen, Germany

Book Chapter

[1] Stereotactic Image-Guidance for Ablation of Malignant Liver Tumors
I. Paolucci, **R.-M. Sandu**, P. Tinguely, C. Kim-Fuchs, M. Maurer, D. Candinas, S. Weber, and A. Lachenmayer
Liver Cancer, 2019
DOI: 10.5772/intechopen.89722

References

Available upon request.