

# Anna Petrova

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E-mail Address: [anyapetrova2797@gmail.com](mailto:anyapetrova2797@gmail.com)

LinkedIn profile: <https://www.linkedin.com/in/anya-petrova-372a8a250/>

WhatsApp: +43-664-381-04-90

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## Research Interests

I am interested in linear accelerator radiotherapy, brachytherapy, and radionuclide therapy as I believe this is the future of cancer treatment.

- Nuclear Medicine and Diagnostic Imaging
- Dosimetry and Medical Radiation Physics
- Radiation Biology and Radiotherapy
- Nutritional and Health-Related Environmental Studies

## Educational

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**M. Sc. Nuclear Physicist**                      **Peter the Great St. Petersburg Polytechnic University, Russia**  
**2020-2022**

**Thesis:** Calculation of absorbed dose in the organs of patients with prostate cancer during radionuclide therapy with <sup>225</sup>Ac-PSMA

**B. Sc. Medical Physicist**                      **Belarusian State University, Belarus**  
**2015-2020**

**Thesis:** Determination of organ and effective doses of internal irradiation of patients during radionuclide therapy with <sup>223</sup>Ra-DICHLORIDE

## Professional Experiences

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- **Medical Physicist**                      **Petrov National Medical Research Center of Oncology, Russia**  
**01/2021-09/2021**  
Description of Duties: Calculation of plans in Varian Eclipse (VMAT, IMRT and 3D), Brachytherapy.
- **Junior Research Fellow** **Saint-Petersburg Research Institute of Radiation Hygiene after Professor P.V. Ramzaev, Russia**  
**06/2021-present**  
Description of Duties: Calculation of doses in radiosensitive organs and tissues using specialized software; Development of biodistribution models for radionuclides.
- **Fellow**                                      **International Atomic Energy Agency (IAEA), Austria**  
**09/2021-12/2022**  
Description of Duties: Work with IRIS database; Designing and implementing the online platform for collecting data from the hospitals participating in the new Study on Patient Doses and Tissue Reaction in Fluoroscopy Guided Interventional Procedures; The implementation in the Articulate and PCL4net of the RPOP e-learning in Russia.
- **PhD Student** **Medical University of Vienna**  
**23/01/2023-present**  
Deep learning for Segmentation of Multiple Sclerosis lesions using multi-contrast MRI 7 Tesla data

## Publications

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### 1. Radiation Hygiene, 2022

**Petrova A.E.,** Chipiga L.A., Vodovatov A.V., Stanzhevsky A.A., Maystrenko D.N., Lumpov A.A., Sinyukhin A.B., Boykov I.V., Rameshvili T.E. *Estimation of absorbed doses in patients' organs from the released radionuclide-label during radionuclide therapy with <sup>225</sup>Ac.* DOI: <https://doi.org/10.21514/1998-426X-2022-15-1-120-131>

## 2. Radiation Hygiene, 2021

Chipiga L.A., **Petrova A.E.**, Vodovatov A.V., Stanzhevsky A.A., Lumpov A.A., Lavreshov D.D., Naurzbaeva L.E., Kushnarenko S.M., Mosunov A.A. *Patient organ and effective dose estimation in radionuclide therapy with <sup>223</sup>Ra -dichloride.* DOI: <https://doi.org/10.21514/1998-426X-2020-13-4-6-16>

## 3. Radiation Hygiene, 2020

Chipiga L.A., Vodovatov A.V., **Petrova A.E.**, Stanzhevsky A.A. *Patient organ and effective dose estimation in radionuclide therapy with <sup>223</sup>Ra -dichloride.* DOI: 10.21514/1998-426X-2020-13-4-6-16

## 4. Pharmacy Formulas, 2020

Stanzhevsky A.A., Mosunov A.A., Chipiga L.A., Vodovatov A.V., Naurzbaeva L., Kushnarenko S.M., Lavreshov D.D., **Petrova A.E.** *Development of the design of the preclinical trials of radiopharmaceuticals for the radionuclide diagnostics and therapy based on the AMBA peptide.* DOI: 10.17816/phf52958

## Current Project

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I am currently using deep learning for lesion segmentation in the context of analyzing Multiple Sclerosis (MS). I employ deep learning techniques, including Convolutional Neural Networks (CNNs) and other advanced models, to automatically identify and delineate lesions associated with Multiple Sclerosis for medical purposes. These images are typically acquired using techniques such as Magnetic Resonance Imaging (MRI), specifically 7 Tesla multi-contrast MRI data.

## Poster Presentations

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### 1. May, 2017

**Sakharov Readings 2017: Environmental Problems of the XXI-s Century**  
Problems of development of the market for organic products.

### 2. May, 2018

**Sakharov Readings 2018: Environmental Problems of the XXI-st Century**  
The use of proton and electron accelerators in the treatment of cancer.

### 3. April, 2020

**International Congress XII “Nevsky radiological forum-2020”**  
Comparison of <sup>223</sup>Ra-dichloride biodistribution models for assessing internal exposure.

### 4. April, 2021

**International Congress XII “Nevsky radiological forum-2021”**  
Determination of organ and effective doses of internal irradiation of patients during radionuclide therapy with <sup>223</sup>Ra-dichloride.

### 5. September, 2022

**International Conference on Occupational Radiation Protection: Strengthening Radiation Protection of Workers – Twenty Years of Progress and the Way Forward (CN-300)**  
Radiation protection awareness of healthcare staff – an essential issue in medical uses of ionizing radiation.

## Professional Skills

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- Scientific research, analysis, and writing (proposal writing and developing research ideas and methodologies).
- Calculation of plans (IMRT, 3D, VMAT, Brachytherapy)
- Dose assessment for radionuclide therapy
- Estimation of the expected internal dose from the incorporated K-40

- Radiological protection against exposure to radon (AlphaGuard)
- Work with dosimeters and spectrometers (DKG-AT2503, DKG-RM1610, DBG-06T, MKS-AT6130, MKS-AT1125, MKS-AT1121, MKS-AT1117, MKS-AT1315)
- Work with liquid scintillation analyzer TRI-CARB

## **Software Skills**

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- Python
- SQL
- Django
- Django REST
- HTML
- CSS
- IDAC
- SAAM II
- PyTorch
- MATLAB
- SPM12 LST