

- **Institution's name**

Maastricht Radiation Oncology (MAASTRO)

- **Website**

<http://www.maastrro.nl/>

- **Institution's picture and logo**



- **Description of the institution**

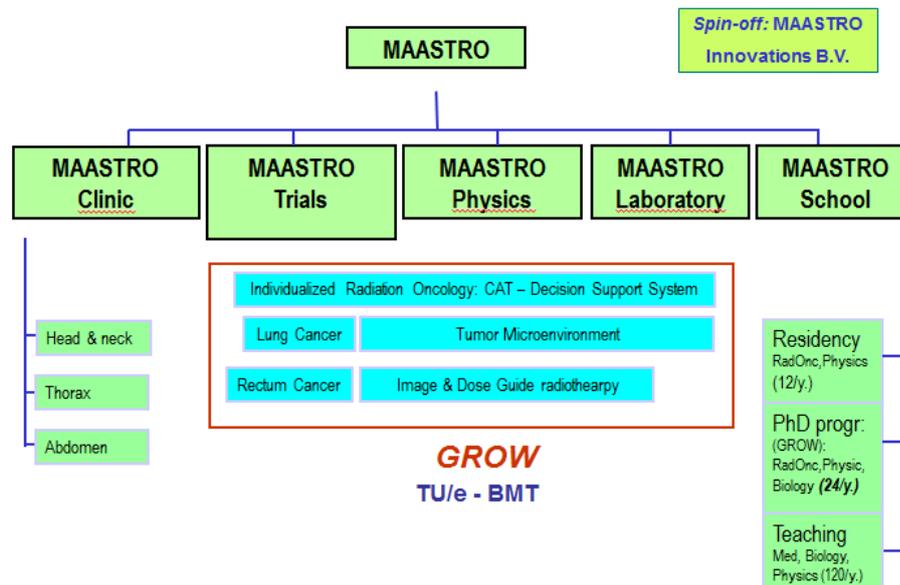
Maastricht Radiation Oncology (MAASTRO) is the name of the Limburg Radiotherapy Institute, founded in 1977. Our purpose is to treat cancer patients in Central and South Limburg using a form of treatment known as radiation therapy or radiotherapy. MAASTRO administers two types of radiotherapy:

- megavolt radiotherapy: the radioactive source is external and the radiation penetrates the tumour through the skin and surrounding tissue. A linear accelerator is used, the object being to damage the DNA of the tumour cells, as illustrated by our logo;
- brachytherapy: radiation that is introduced into the tumour directly from the radioactive source. This method is used when the tissue surrounding the tumour is particularly sensitive (for example, the nose or throat).

In addition to treating patients, the MAASTRO clinic decided in 2000 to turn its attention to medical research. The clinic works closely with Maastricht University (UM), University Hospital Maastricht (azM), and Eindhoven University of Technology (TU/e). Our medical director, Dr. Philippe Lambin, is also a professor at UM and chair of the radiotherapy capacity group there, head of the radiotherapy department at azM, and a professor at the TU/e. The fact that many MAASTRO radiation oncologists and clinical physicists spend a portion of their week conducting medical research has also cemented the ties between our clinic and academia. MAASTRO trains radiation oncologists, clinical physicists, radiation Laboratory technicians, biologists and IT specialists in Maastricht and elsewhere.

We also teach students at the universities of Maastricht and Eindhoven. We collaborate with various institutes in the field of training and education, and intend adding to our list of partners in the years ahead, both in the Netherlands and abroad.

### Functional organogram of MAASTRO (involving three legal entities)



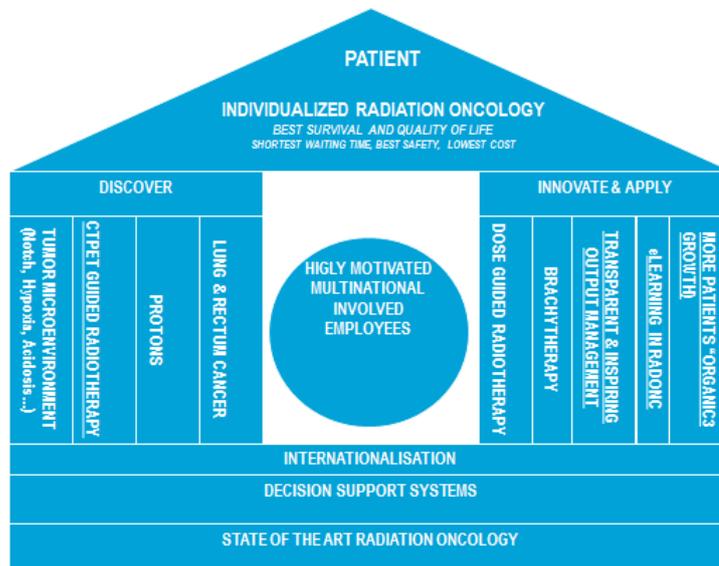
#### - Description of the RO department

MAASTRO Clinic offers state-of-the-art radiotherapy to more than 3500 cancer patients each year from the Mid and South Limburg area in the Netherlands. MAASTRO Clinic currently has 6 modern linear accelerators, 4 in Maastricht and 2 in Venlo, all equipped with EPID (electronic portal imaging) and with Cone Beam CT. It was the first center with a CT-PET scanner dedicated for radiotherapy, which now includes the possibility to acquire dynamic PET scans and 4D-CT-PET in lung cancer patients. Both a small and large bore multislice CT with 4D-CT option is available. At MAASTRO Clinic stereotactic (SBRT) and intensity-modulated radiation therapy (IMRT), image guided radiotherapy (IGRT) and in-vivo dosimetry using both EPIDs (dose guided radiotherapy) in daily practice. Within our department 29.5% of all patients are included in clinical trials and 49.8% of patients for whom a clinical trial is available. MAASTRO established a data warehouse to collect, relate and interpret clinical, imaging, treatment and molecular data from patients. The warehouse includes but is not limited to, patient records, medical history, registry data, molecular profiles, gene expression data, clinicopathologic data, treatment data (including 2D dose administration) and raw DICOM images. Initiating the extraction of mineable data from these images to this database is a significant component of the current proposal. All data are stored and utilized in compliance with European ethical requirements.

#### - Areas of specialization

The strategic highlights of MAASTRO are: Lung Cancer, Rectum Cancer, Tumour Hypoxia and EGFR. An important strategic goal is individualization of treatment for our patients (Decision Support System). In order to reach this goal we have to be able to accurately assess risks and benefits associated with (chemo) radiation treatment by analyzing available patient data. Therefore, clinical patient data and outcome data is recorded in the electronic patient file since 2005 and PET/CT images are stored in a database. We have extensive expertise in developing prediction models for survival as well as toxicity outcome with published series in major American and European

radiotherapy journals (see also [www.predictcancer.org](http://www.predictcancer.org)). In addition, translational research is one of our strengths. Our integrated structure and dynamic laboratory, the many clinical trials we conduct and our outstanding clinic all bridge the gap between research and treatment.



- **Ongoing projects/studies/clinical trials**

**Clinical (related) studies:**

Project on cosmetic results after breast conserving therapy

-RCT: A Prospective randomized phase II trial evaluating the potential efficacy of SOM230 (Pasireotide) in preventing intestinal radiation injury during and after radiotherapy of the abdomen and pelvis.

-Non invasive imaging of Cetuximab-Zirconium-89 uptake with Positron-Emission-Tomography (PET) scans: A phase I trial in stage IV non-small cell lung cancer patients

-Cognitive sequelae of Prophylactic Cranial Irradiation in non-small cell lung cancer patients

-Feasibility study testing contrast-enhanced ultrasound (CEUS) image guidance in SBRT of liver lesions

-Standard follow up program (SFP) for head and neck cancer patients treated with curative primary or postoperative radiotherapy or chemoradiation (SFP head & neck)"

-Low-dose radiotherapy for painful osteoarthritis in patients for whom regular treatment options are not suitable: a pilot study

-Nomograms and their value in predicting treatment outcome in cervix ca.; towards the development of individualised therapy in cervix ca. (versie 01-11-2010)

-European study on MRI-guided brachytherapy in locally advanced cervical cancer EMBRACe (endorsed by GEC ESTRO)

-Treatment of pain in head and neck cancer patients: Is methadone more effective than fentanyl

- Non invasive imaging of [18F]HX4 with Positron-Emission-Tomography (PET) in Head and Neck Cancer
- Storage of head and neck tumor samples in a biobank for future genomic-based research aiming at improved outcome prediction: “The head and neck tumor biobank”
- Randomised study between Cisplatinium or Cetuximab and standard high dose or adaptive high dose radiation for patients with advanced head and neck cancer
- External beam radiotherapy for unresectable hepatocellular carcinoma. A multicenter phase I/II trial.
- Randomized trial on chest irradiation in extensive disease small cell lung cancer
- Chloroquine as an anti-autophagy drug in small cell lung cancer (SCLC) patients: A phase I trial to be followed by a phase II trial.
- Cognitive sequelae of Prophylactic Cranial Irradiation in non-small cell lung cancer patients
- Dose-escalation by boosting radiation dose within the primary tumor on the basis of a pre-treatment FDG-PET-CT scan in stage IB, II and III NSCLC: A randomized phase II trial.
- Nitroglycerin`s effect on perfusion and hypoxia in human non small cell lung cancer: proof of principle, a phase 2 trial
- Radiomics: a prospective study of outcome in lung cancer
- ChemoRadiotherapy after Induction chemoTherapy In Cancer of the Stomach
- SUPREMO, an MRC phase III randomised trial to assess the role of adjuvant chest wall irradiation in ‘intermediate risk’ operable breast cancer following mastectomy
- Breast cancer with low risk of local recurrence: partial and accelerated irradiation with three-dimensional conformal radiotherapy (3DCRT) vs. standard radiotherapy after conserving surgery (phase III study)
- Radiotherapy After Primary CHEMotherapy for cT1-2pN+M0 breast cancer
- Radiation Doses and Fractionation Schedules in Non-Low Risk Ductal Carcinoma In Situ (DCIS) of the Breast
- Breath test for breast cancer
- Adjuvant postoperative high-dose radiotherapy for atypical and malignant meningioma: a Phase-II and observation study (EORTC 22042-26042)
- Phase III trial on Concurrent and Adjuvant Temozolomide chemotherapy in non-1p/19q deleted anaplastic glioma. The CATNON Intergroup trial.
- Phase I/II study for patients with newly diagnosed glioblastoma testing nelfinavir in combination with concomitant temozolomide and radiotherapy.
- Phase III Intergroup Study of Radiotherapy versus Temozolomide Alone versus Radiotherapy with Concomitant and Adjuvant Temozolomide for Patients with 1p/19q Codeleted Anaplastic Glioma
- A randomized phase III study of temozolomide and radiation versus radiation alone in the treatment of newly diagnosed glioblastoma multiforme inlderly patients

-Medulloblastoma in adults

-Post-operative external radiotherapy combined with concomitant and adjuvant hormonal treatment versus post-operative external radiotherapy alone in pathological stage pT3a-b R0-1 N0M0 / pT2 R1 N0M0, Gleason score 5-10 prostatic carcinoma.

-Feasibility study of image-guided radiotherapy with repeated 3D ultrasound imaging

-A phase I/II trial testing Nelfinavir, an inhibitor of Akt signaling, in combination with preoperative chemoradiotherapy in patients with locally advanced rectal cancer

-A clinical trial testing Rapamycin, an mTOR/inhibitor, in combination with preoperative radiotherapy in operable rectum cancer: A phase I-II study

-Dose Reduction of preoperative radiotherapy in Myxoid liposarcomas

-Dexamethasone for the prevention of a pain flare after palliative radiotherapy for painful bone metastases: a multicenter double-blind placebo-controlled randomized study.

-Outpatient clinic to evaluate late outcome in patients curatively treated for breast carcinoma in MAASTRO Clinic.

-International Cross-Cultural Field Validation of an EORTC Questionnaire Module for the Assessment of Cancer Related Fatigue (EORTC QLQ-FA13)

-Phase II study of definitive radiochemotherapy for locally advanced squamous cell cancer of the vulva: an efficacy study"

-Patient preference: Endometrium Carcinoma

-Randomized Phase III Trial Comparing Concurrent Chemoradiation and Adjuvant Chemotherapy with Pelvic Radiation Alone in High Risk and Advanced Stage Endometrial Carcinoma: PORTEC-3

-Postoperative Radiation Therapy for Endometrial Carcinoma Multicenter Randomised Phase III Trial Comparing Vaginal Brachytherapy (Two Dose Schedules) with Observation after Surgery

-GROningen INternational Study on Sentinel nodes in Vulvar cancer (GROINSS-V) II

-ARTFORCE: Adaptive and innovative Radiation Treatment FOR improving Cancer patients' treatment outcome

-AIR FORCE project: Personalized chemo-radiation of lung and head and neck cancer

-Project on bloodimaging: Prediction of survival in Non Small Cell Lung Cancer using blood markers and imaging features: Hypothesis driven approach with prospective validation

-DATAMANAGEMENT MRI2: Diagnostic value of novel MR imaging techniques for the primary staging and restaging of rectal cancer

-Feasibility study testing contrast-enhanced ultrasound (CEUS) image guidance in SBRT of liver lesions

-Standard follow up program (SFP) for head and neck cancer patients treated with curative primary or postoperative radiotherapy or chemoradiation (SFP head & neck)"

-Low-dose radiotherapy for painful osteoarthritis in patients for whom regular treatment options are not suitable: a pilot study

-Nomograms and their value in predicting treatment outcome in cervix ca.; towards the development of individualised therapy in cervix ca. (versie 01-11-2010)

-European study on MRI-guided brachytherapy in locally advanced cervical cancer EMBRACe (endorsed by GEC ESTRO)

-Treatment of pain in head and neck cancer patients: Is methadone more effective than fentanyl

-Non invasive imaging of [18F]HX4 with Positron-Emission-Tomography (PET) in Head and Neck Cancer

-QuIC-ConCePT: Quantitative Imaging in Cancer: Connecting Cellular Processes with Therapy

-Storage of head and neck tumor samples in a biobank for future genomic-based research aiming at improved outcome prediction: "The head and neck tumor biobank"

-METOXIA project: Metastatic tumours facilitated by hypoxic tumour micro-environments

-Project on Dose rate genetics. Research to gain insight in treatment combinations which will lead to new opportunities for drug combination and/or individualized approaches.

-Project on NGI using MDNA variants in predicting of radiation-induced lung toxicity in patients that undergo radiotherapy

#### **Knowledge engineering (ICT):**

- Trait project: Translational Research IT

-EURECA project: Enabling information re-Use by linking clinical REsearch and CARE

-SEDI project: Development of a semantic web module and PACS system for radiotherapeutic practice

-DuCAT : The Dutch Network of Computer Assisted Theragnostics

-EUROCAT: The European Network of Computer Assisted Theragnostics

#### **Physics:**

-Project on advanced Model-Based Dose Calculations for Brachytherapy Clinical Applications"

-Project on Adaptive radiotherapy based on electronic portal imaging dosimetry

-ENVISION project: European NoVel Imaging Systems for ION therapy

-STERRPA project: Small animal x-ray irradiator for the Spatio-Temporal-Energetic Radiation Research Platform for Animals

-QuIC-ConCePT: Quantitative Imaging in Cancer: Connecting Cellular Processes with Therapy

-ARTFORCE WP4: Adaptive and innovative Radiation Treatment FOR improving Cancer patients' treatment outcome

#### **Biology:**

-Project on Hypoxia induced autophagy

-METOXIA project : Metastatic tumours facilitated by hypoxic tumour micro-environments

-CDEPT project: Use of non-pathogenic engineered Clostridia as delivery vector for toxic gene products to the tumour

-Project on CA IX as a target for imaging and cancer treatment with radiotherapy

-Project on Autophagy signalling, requirement for sustaining the tumor microenvironment

- **In-House news (conferences, workshops, training opportunities, etc.)**

PhD program: <http://www.maastrou.nl/nl/6/323/general-information.aspx>

eLearning environment: <http://www.maastrou.nl/nl/6/439/what-is-elearning.aspx>

- **Equipment used in the department**

MAASTRO Clinic currently has 6 modern linear accelerators from Varian

- **Any other relevant information**

We have a GCP compliant Data Center (<http://www.maastrou.nl/en/5/40/about-maastrou-clinic-trials.aspx>). We are certified by EORTC and RTOG.

We request a licence for protontherapy (<http://www.maastrou.nl/en/1/402/proton-therapy.aspx>)

Other relevant websites:

<http://www.predictcancer.org/>

<https://www.cancerdata.org/>

<http://www.eurocat.info/>

<http://www.mistir.info/>