



GATE

Simulations of Preclinical and Clinical Scans in Emission Tomography, Transmission Tomography and Radiation Therapy

2011 Nuclear Science Symposium and Medical Imaging Conference

What's new in GATE ?



Documentation

- GATE documentation is now provided as a wiki
- Any user is allowed to contribute after registration (by default, contribution is not enabled)

The screenshot shows the GATE collaborative wiki interface. At the top right, there is a 'Log in' link. Below it, navigation tabs for 'page', 'discussion', 'view source', and 'history' are visible. The main content area displays the title 'Users Guide V6.1' and a list of sections: Introduction, General Concept, Getting started, Defining a geometry, Materials, Setting up the physics, Cut and Variance Reduction Techniques, Source and particle management, Voxalized Source and Phantom, How to run Gate, Visualization, and Bibliography. Below these sections, 'Imaging applications' is listed, followed by 'Architecture of the simulation' and 'Defining a system for imaging applications'. On the left side, there is a navigation menu with links to Main Page, Community portal, Current events, Recent changes, Random page, and Help. Below the navigation menu is a search box with 'Go' and 'Search' buttons. At the bottom left, there is a toolbox with links to What links here, Related changes, Upload file, and Special pages.



Distribution of GATE as a virtual image

- Seems to be a success as users can run GATE in a few minutes on any host machine using the VirtualBox software (no Geant4 installation, no GATE installation)
- The vGATE image corresponding to GATE V6.1 will be distributed by the end on November 2011
- Good for trying GATE, not for massive data production



GATE for radiotherapy and hadrontherapy

- We provide **recommendations for physics lists**

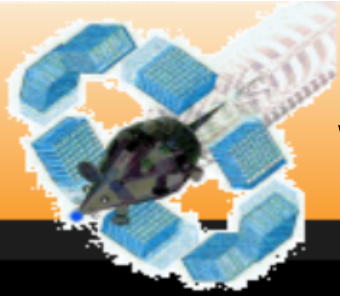
Documentation and Recommendations for Users

Recommendations

- Setting the Physics Parameters for Radiation Therapy Applications
- Setting the Physics Parameters for Proton Therapy Applications
- Setting the Physics Parameters for Carbon Therapy Applications

GATE is the only integrated framework to enable modeling of radiotherapy/hadrontherapy and imaging

Research is on-going to provide more recommendations for users



Where to meet GATE developers

- On the GATE website, we now advertise the meetings in which you can meet some members of the OpenGATE collaboration or where we have some GATE-related events



GATE

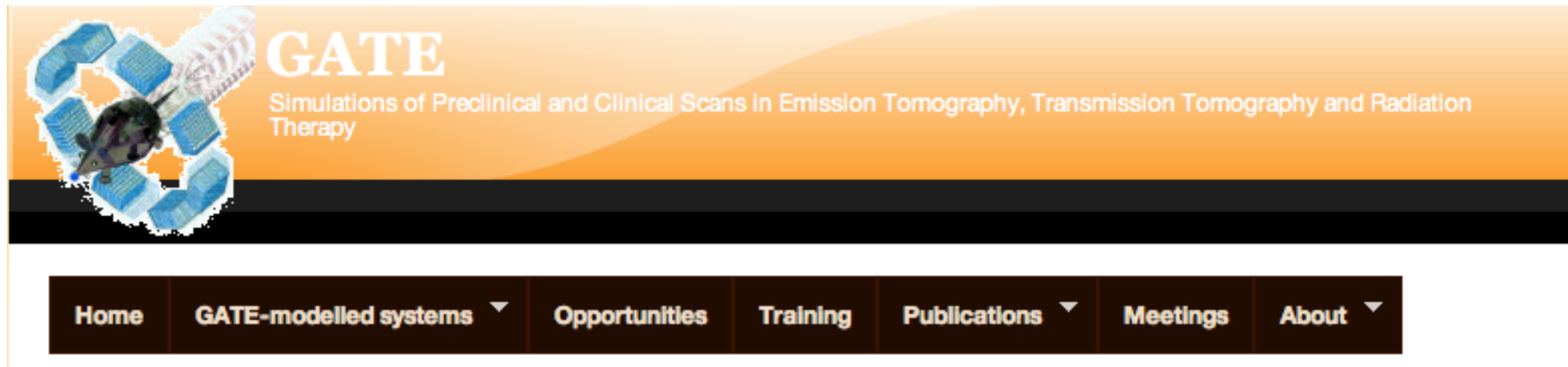
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Systems modeled in GATE

- You can find a list of systems (PET, SPECT, and **more recently radiotherapy systems**) on the GATE website, with associated references



- Only the systems that have been modeled by members of the collaboration are listed
- Other models do exist, please post on the gate-user list if you are looking for a specific model, some colleagues are willing to share






Radiotherapy systems

GateRT/Systems

Systems simulated with Gate

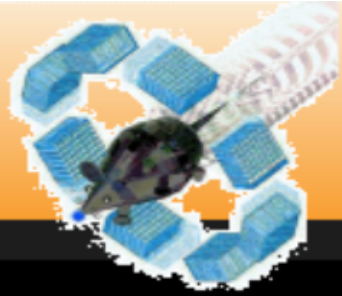
Please contact the authors if you need more information.

Name	Description	Reference	Contact	figure
Varian Medical System - Clinac 2100C	6MeV and 20MeV electron beams. Simulation of the linac head (vacuum window, scattering foils, monitor chamber, jaws, exit window) and applicators	[Maigne et al, PMB2011 ↗]	Yan ✉ Lydia ✉	
Siemens Artiste	Modelling of 6 MV and 18 MV photon beams, dosimetric validation (comparison between measurements and simulation results) and validation against the PENELOPE MC code	[D. Lazaro-Ponthus, L. Guérin, A. Batalla, T. Frisson and D. Sarrut, Commissioning of PENELOPE and GATE Monte Carlo models for 6 and 18 MV photon beams from the Siemens Artiste linac, 11th Biennial ESTRO, London UK, May 2011.]	Delphine ✉	
SIEMENS ONCOR Impression, MLC 160 leaves.	Modelling of the head, 6 MV photon beam simulation, dosimetric validation (comparison between simulation and experimental measures), step and shoot IMRT simulation	Benhalouche S, Visvikis D, Pradier O, Bousson N. Simulation of a 6 MV SIEMENS Oncor Linear accelerator photon beam with GATE : a dosimetric study. 53rd American Association of Physicists in Medicine (AAPM) Annual Meeting, Vancouver, Canada, 2011.	Nicolas ✉ Saadia ✉ Dimitris ✉	



Management of development priorities in GATE

- Development priorities are driven by funding !
- Highest priorities are given to GATE developments we committed to perform as part of funded projects.
- Currently:
 - Monte Carlo simulations for hadrontherapy monitoring by prompt gamma or PET imaging
 - Monte Carlo simulations for optical imaging
 - Options to speed up GATE (GPU, multithreading, hybrid models combining Monte Carlo and analytical modeling)



Next training session

- Next training will take place in Saclay, near Paris, France, on

February 14th-16th, 2012

- Save the date or pass the word around, registration procedure will open mid-november



Key links

- <http://www.opengatecollaboration.org>

for information, registration, download

- gate-users@lists.opengatecollaboration.org

for posting questions or GATE-related announcements

Thank you !