

First Geant4 Tutorial Workshop in São Paulo



Report of Contributions

Contribution ID: 1

Type: **not specified**

Welcome

Monday 4 February 2019 09:00 (10 minutes)

Presenter: COSENTINO, Mauro Rogerio (Universidade Federal do ABC (BR))

Session Classification: Day 1

Contribution ID: 2

Type: **not specified**

Tutorial introduction

Monday 4 February 2019 09:10 (10 minutes)

- Network, logistics
- Tutorial structure
- Lecturers introduction

Presenter: COSENTINO, Mauro Rogerio (Universidade Federal do ABC (BR))

Session Classification: Day 1

Contribution ID: 3

Type: **not specified**

Introduction to detector simulation

Monday 4 February 2019 09:20 (20 minutes)

Basic concepts of Monte Carlo and detector simulation

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 1

Contribution ID: 4

Type: **not specified**

Kernel I

Monday 4 February 2019 09:40 (50 minutes)

- General introduction of Geant4
- Use-case studies in HENP, space, medicine and other user domains
- Global structure of Geant4
- Run, event, track, step, trajectory, etc.
- User classes

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 1

Contribution ID: 5

Type: **not specified**

User documents and examples

Monday 4 February 2019 10:50 (30 minutes)

- Installation Guide
- Application developer's manual
- Toolkit developer's manual
- Physics reference manual
- Novice examples in Geant4 distribution
- Extended and advanced examples in Geant4 distribution
- LXR source code browser
- HyperNews

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 1

Contribution ID: 6

Type: **not specified**

User interface I

Monday 4 February 2019 11:20 (30 minutes)

- Syntax of UI command
- Interactive mode / batch mode
- G4UIExecutive class

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 1

Contribution ID: 7

Type: **not specified**

Visualization I

Monday 4 February 2019 11:50 (30 minutes)

- Introduction to Visualization
- Quick Looks at Seven Visualization Drivers
- Basic Visualization Commands

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 1

Contribution ID: 8

Type: **not specified**

Scoring I

Monday 4 February 2019 13:30 (40 minutes)

- Introduction to sensitivity
- Command-based scoring
- Add a new scorer/filter

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 1

Contribution ID: 9

Type: **not specified**

Physics I

Monday 4 February 2019 14:10 (50 minutes)

- Introduction
- G4VUserPhysicsList class
- Modular physics list
- Packaged physics lists
- Choosing appropriate Physics List

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 1

Contribution ID: **10**

Type: **not specified**

Material definition

Tuesday 5 February 2019 09:00 (30 minutes)

- Defining Materials
- NIST Material database

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 2

Contribution ID: 11

Type: **not specified**

- Complete Geant4 installation and execute a few examples to confirm the installation

- > Hands-on instruction
- Additional links
- > Installation guide
- > Troubleshooting: Installation and Configuration thread of Hypernews

Session Classification: Hands-On

Contribution ID: **12**

Type: **not specified**

Geometry I

Tuesday 5 February 2019 09:30 (1 hour)

- Introduction
- G4VUserDetectorConstruction class
- Solid
- Logical volume
- Region
- Physical volume
- Placement

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 2

Contribution ID: **13**

Type: **not specified**

Hands-On: Session I

Monday 4 February 2019 15:20 (2 hours)

Complete Geant4 installation and execute a few examples to confirm the installation

- Hands-on instruction
- Additional links – Installation guide – Troubleshooting: Installation and Configuration thread of Hypernews

Contribution ID: **14**

Type: **not specified**

Hands-On: Session I

Complete Geant4 installation and execute a few examples to confirm the installation

Session Classification: Hands-On

Contribution ID: 15

Type: **not specified**

Hands-On: Session II

Tuesday 5 February 2019 15:20 (2 hours)

- Material and a simple geometry
 - Visualization of geometry
 - Command-based scoring
- Hands-On instruction

Contribution ID: **16**

Type: **not specified**

Primary particle

Tuesday 5 February 2019 10:50 (30 minutes)

Introduction

Built-in primary particle generators

- Particle gun

- Interfaces to HEPEVT and HEPMC

- General particle source

Pre-assigned decay

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 2

Contribution ID: 17

Type: **not specified**

Physics II

Tuesday 5 February 2019 11:20 (1 hour)

- Physics components - General process interface - Secondary production threshold

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 2

Contribution ID: **18**

Type: **not specified**

Physics III

Tuesday 5 February 2019 13:30 (30 minutes)

- Decay
- Optical
- Phonon, electron/hole
- Channeling

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 2

Contribution ID: **19**

Type: **not specified**

Geometry II

Tuesday 5 February 2019 14:00 (1 hour)

- Parametrized volume
- Replicated volume
- Divided volume
- Nested-parameterization
- Assembly volume
- Reflected volume
- Touchable

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 2

Contribution ID: **20**

Type: **not specified**

EM physics I

Wednesday 6 February 2019 09:00 (45 minutes)

- EM standard overview

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 3

Contribution ID: 21

Type: **not specified**

Scoring II

Wednesday 6 February 2019 11:35 (45 minutes)

- Define scorers in the tracking volume
- Accumulate scores for a run
- Sensitive detector vs. primitive scorer
- Basic structure of detector sensitivity
- Sensitive detector and hit
- Touchable
- Use of G4HCofThisEvent class

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 3

Contribution ID: 22

Type: **not specified**

EM physics II

Wednesday 6 February 2019 10:50 (45 minutes)

- Low-E EM overview
- DNA physics

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 3

Contribution ID: 23

Type: **not specified**

Geometry III

Wednesday 6 February 2019 09:45 (45 minutes)

- Magnetic field
- Field integration and other types of field
- GDML interface
- CAD interface
- Geometry checking tools
- Geometry optimization

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 3

Contribution ID: 24

Type: **not specified**

EM physics III

Wednesday 6 February 2019 13:30 (50 minutes)

- specific topics of standard EM physics modelling:
- energy-loss processes
- multiple scattering
- their role in Geant4 stepping

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 3

Contribution ID: 25

Type: **not specified**

User interface II

- Define user commands

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 3

Contribution ID: 26

Type: **not specified**

Hands-On: Session III

Wednesday 6 February 2019 15:20 (2 hours)

- Complete geometry
 - Define scorers
 - User Actions I: printing information on the screen
- Hands-On instruction

Contribution ID: 27

Type: **not specified**

Hands-On: Session IV

Thursday 7 February 2019 15:20 (2 hours)

- User Actions II: Accumulating information from a run
 - Use g4tools to create histograms and output ntuple files
- Hands-On instruction

Contribution ID: **28**

Type: **not specified**

Hadronic physics I

Thursday 7 February 2019 09:00 (45 minutes)

- Hadronic physics overview
- Pre-compound/de-excitation models
- Cascade models

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 4

Contribution ID: 29

Type: **not specified**

UserInterface II

Thursday 7 February 2019 09:45 (45 minutes)

- Mechanism of UI command
- Defining basic UI command
- Defining complex UI command
- G4GenericMessenger
- UI command in multithreaded mode

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 4

Contribution ID: **30**

Type: **not specified**

Hadronic physics II

Thursday 7 February 2019 10:50 (40 minutes)

- Elastic process
- Neutron physics
- Ion physics
- Capture, stopping and fission models

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 4

Contribution ID: 31

Type: **not specified**

Multithreading I

Thursday 7 February 2019 11:30 (20 minutes)

- Introduction to multithreading
- UI commands for multithreading

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 4

Contribution ID: **32**

Type: **not specified**

Hadronic physics III

Thursday 7 February 2019 13:30 (45 minutes)

- String models
- Gamma- and Electro-nuclear models
- Radioactive decay

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 4

Contribution ID: 33

Type: **not specified**

Visualization II

Thursday 7 February 2019 14:15 (20 minutes)

- Visualization commands

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 4

Contribution ID: **34**

Type: **not specified**

Geometry IV

Thursday 7 February 2019 14:35 (25 minutes)

- Parallel geometry
- Layered mass geometry
- Moving objects

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 4

Contribution ID: 35

Type: **not specified**

Analysis

Thursday 7 February 2019 11:50 (30 minutes)

- G4Tools : built-in analysis tool

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 4

Contribution ID: 36

Type: **not specified**

Event biasing

Friday 8 February 2019 09:00 (45 minutes)

- Overview
- Geometrical biasing
- Physics biasing
- Bremsstrahlung splitting

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 5

Contribution ID: 37

Type: **not specified**

Multithreading II

Friday 8 February 2019 09:45 (45 minutes)

- Thread safety
- MPI
- File I/O in multithreaded mode

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 5

Contribution ID: **38**

Type: **not specified**

Physics list

Friday 8 February 2019 10:50 (30 minutes)

- Choice of physics list
- Validation of physics lists

Presenter: NOVAK, Mihaly (CERN)

Session Classification: Day 5

Contribution ID: 39

Type: **not specified**

Kernel II

Friday 8 February 2019 11:20 (1 hour)

- User limits
- User information classes
- Fast simulation (a.k.a. shower parameterization)
- Stack management

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 5

Contribution ID: **40**

Type: **not specified**

Q/A

Friday 8 February 2019 13:30 (40 minutes)

Session Classification: Day 5

Contribution ID: 41

Type: **not specified**

How to Update Your Geant4 Installation

Friday 8 February 2019 14:10 (20 minutes)

- Major versus minor releases
- What to look for in the release notes

Presenter: WRIGHT, Dennis Herbert

Session Classification: Day 5

Contribution ID: 42

Type: **not specified**

Closing remarks

Friday 8 February 2019 14:30 (20 minutes)

Presenter: ASAI, Makoto (SLAC National Accelerator Laboratory (US))

Session Classification: Day 5

Contribution ID: 43

Type: **not specified**

Hands-On: Session III

Wednesday 6 February 2019 14:20 (40 minutes)

- Complete geometry
 - Define scorers
 - User Actions I: printing information on the screen
- Hands-On instruction