

# Curriculum Vitae

Guilherme Lima

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## 1 Personal Data

- Full Name: **José Guilherme Rocha de Lima**
- Birth: September 26, 1967 — Belém, PA, Brazil
- Civil Status: Married to Gabriella Lima (2 children)
- Citizenship: Brazilian
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## 2 Education

- Ph.D. in Experimental High Energy Physics, CBPF, Brazil, 1995.  
Thesis: *Study of the Inclusive Muon Production Cross Section at Small Angles in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.8$  TeV*
- M.Sc. in Experimental High Energy Physics, CBPF, Brazil, 1991.  
Thesis: *Experimental analysis of doubly Cabibbo-suppressed decay  $D^+ \rightarrow \phi K^+$*
- B.S. in Physics, Federal University of Pará, Brazil, 1988.

### 3 Employment

Research Associate, Northern Illinois University, DeKalb, IL (USA). Dec 2003 - Present

Visiting Assistant Professor, Northern Illinois University, DeKalb, IL (USA). May 2003 - Dec 2003

Guest scientist, Particle Physics and Computing Divisions, Fermilab (USA). 1998-2000

Professor at the Nuclear and High Energy Physics Department (DFNAE), State University of Rio de Janeiro (UERJ), Brazil. 1996-2003

Guest scientist, Particle Physics Division, Fermilab, USA. 1991-1993

### 4 Experience and Skills

Large experience with HEP data analysis. Topics include the study of exclusive decays of charmed  $D^+$  and  $D_s^+$  mesons into  $\phi K^+$  final states using E-691 data, and inclusive muon production cross sections at small angles using DØ Run I data. The analysis of Calice test beam data is currently in its preliminary stages. **Skills:** Confidence with statistical data analysis, and familiarity with analysis tools largely used in HEP, like JAS3, Wired, Root, ntuples and Minuit, Cernlib, PAW and the Fortran programming language.

Extensive experience with the development of software tools for HEP. Most relevant work includes the collaborative development of Geant4-based full-detector simulations (LCDG4 and Mokka TCMT geometry driver), digitization simulation (DigiSim) and PFA reconstruction for the ILC Detectors. Previous research work includes online and offline vertex reconstruction tools for Run II, and the simulation of the level 1 muon trigger for Run I of the DØ experiment. Responsible for the level 1 trigger equations for muons at small angles (Samus-Wamus overlap and Samus regions of the DØ detector). **Skills:** Very familiar with C++ and Java (Object-oriented) programming in high energy physics. Debugging and profiling for optimization of memory consumption and processing time. Familiar with many simulation tools like Geant4, Pythia and Pandora-Pythia, with ILC analysis/reconstruction frameworks like org.lcsim (Java) and Marlin (C++), and with full-detector simulators SLIC and Mokka. Familiar with software development tools like CVS, gdb, Netbeans, Valgrind and Totalview.

Hardware work includes PLD programming and stand-alone debugging of Level 1 muon

trigger boards for Run I and stand-alone electrical debugging of silicon wedges for Run II of the DØ detector. Muon shifter during data collection in Run I (oct/91-oct/93). Global monitor shifter and remote SAM shifter during the Run II data collection. **Skills:** Basic knowledge of electronics and small computer-based VME data acquisition systems. Overview and online monitoring of the complex DØ data acquisition system.

Sub-head of the Nuclear and High Energy Physics Department (DFNAE/UERJ) from January 2002 to April 2003, co-leader of the vertexing group of DØ experiment from Mar/2000 to June/2003. UERJ representative at the DØRace committee from Nov/2001 to Aug/2003. **Skills:** Basic administrative experience, coordination of collaborative work in a small group.

Responsible for system management for the Linux cluster at UERJ/Brazil, including the installation and maintenance of DØRunII software and also the planning for a *GRID*-enabled farm in UERJ, for use by many Brazilian HEP researchers involved in DØ and CMS experiments (deployed without my direct involvement, in late 2004). **Skills:** Linux system installation and system management, NFS, NIS, NTP and basic system security.

Teaching experience includes electricity and optics laboratory classes for engineering majors, and modern physics and statistical mechanics for physics majors. Supervision of undergraduate physics students engaged in research activities (*scientific apprenticeship awardees*).

## 5 Current interests

- **Detector R&D for the International Linear Collider**

The future International Linear Collider (ILC), is currently under design to be operational around 2018, with the purpose of exploring Physics beyond the Standard Model in complementarity to the LHC experiments. Both accelerator and detector subsystems for the ILC are being designed today, and simulation tools are essential at this early stage. It is important for U.S. to bid for hosting this new generation of accelerators and detectors, to stay competitive and leading the forefront in the field of Experimental High Energy Physics. I have been deeply involved with the development of detector simulation and reconstruction tools to support the detector design and optimization for these future experiments.

- **Heavy flavor production at the Tevatron**

Heavy flavor tagging by the presence of moderate-energy muons, specially at small angles. Pseudo-rapidity dependence of muon production cross section. I have

worked on this subject for several years, since my doctoral degree studies.

- **Heavy flavor decays**

The new capabilities of the upgraded DØ detector, and the copious heavy flavor production at the Tevatron allows for the study of heavy flavor decay properties. I have worked on rare decays of charmed mesons in fixed target environment, and it would be interesting to look for rare  $B$ -meson decays in the hadron collider environment.

- **$b$ -tagging and search for Higgs boson and new phenomena at the Tevatron**

Development and optimization of  $b$ -tagging algorithms, which is an essential tool in the search for new phenomena at the Tevatron. In particular, the use of secondary vertexing for  $b$ -tagging and background rejection.

- **GRID computing**

GRID developments promote stronger participation and contribution of worldwide institutions in the computing tasks and needs of future HEP experiments. Distributed computing power and data storage will be made available worldwide through very fast links and GRID-enabled software.

## 6 Talks presented

### 6.1 Invited Lectures

1. “Detector simulations at NICADD/NIU”, ICAR Workshop (Illinois Consortium for Accelerator Research), Argonne, Chicago, May 2004.
2. “Experimental Methods of High Energy Physics”, 4 one-hour lectures presented at the session B of the *V Lafex International School on High Energy Physics*, Rio de Janeiro (Brazil), February 2002.
3. “Perspectives for the DØ Experiment” (translated title) – Colloquium at the Physics Institute/UERJ, Rio de Janeiro (Brazil), 24/jan/2001;
4. “Generalities about experimental high energy physics” (translated title) – Colloquium at the Physics Dept., UFJF, Juiz de Fora (Brazil), 22/jun/1995;
5. “What is experimental high energy physics?” (translated title) – Colloquium at the Physics Dept., UFPa, Belém (Brazil), 06/jan/1994;

## 6.2 Presentations at Conferences

1. “PFA reconstruction with directed tree clustering”, *Vancouver Linear Collider Workshop (VLCW’06)*, Vancouver (Canada), July 2006;
2. “Particle flow reconstruction based on the directed tree clustering algorithm”, *2006 Conference on Calorimetry in High Energy Physics (CALOR’06)*, Chicago (IL), June 2006;
3. “Digitization framework for the Calice test beam”, *CALICE Collaboration Meeting*, Montréal (Canada), May 2006;
4. “Directed tree clustering and PFA status” and “DigiSim tutorial”, *ALCPG Simulations Workshop*, Boulder (CO), January 2006;
5. “Digitization simulation using DigiSim”, *2005 ILC Physics and Detector Workshop (ILCW05)*, Snowmass (CO), August 2005;
6. “LCDG4 and DigiSim, simulation activities at NIU”, *International Linear Collider Workshop (LCWS05)*, Stanford University, Palo Alto (CA), March 2005;
7. “DigiSim, a digitization simulation package”, *CALICE Collaboration Meeting*, Dekalb (IL), March 2005;
8. “A digitization simulation package for the ILC and the CALICE test beam”, *CALICE Collaboration Meeting and ILC Simulations Workshop*, DESY, Hamburg (Germany), December 2004;
9. “Status report on simulation tools at NIU”, *American Linear Collider Workshop*, University of British Columbia, Victoria (Canada), July 2004
10. “Geant4-based simulation, status and plans”, *American Linear Collider Workshop*, SLAC, Menlo Park (CA), January 2004;
11. “Simulation efforts at NIU, status and plans”, *American Linear Collider Workshop*, Cornell University, Ithaca (NY), July 2003;
12. “Vertex reconstruction at the DØ Experiment”, *XXII Encontro Nacional de Física de Partículas e Campos*, São Lourenço (MG), October 2001;
13. “Vertex Analysis Package”, “Primary Vertexing Performance Using the Impact Parameters Algorithm”, e “Primary Vertex Tool for the Level 3 Trigger”, trabalhos apresentados no *DØ Workshop*, De Kalb (IL,USA), June 2000;

14. “DØ results of Run I and perspectives for Run II”, *Workshop on B Physics at the Tevatron – Run II and Beyond*, Fermilab (USA), September 1999;
15. “Perspectives on the use of Hybrid Photodiode Detectors for the Auger Observatory”, VI Auger Collaboration Meeting – Itacuruçá (RJ), May 1998;
16. “Inclusive Muon Production Cross Section at Small Angles at the DØ Experiment”, XV Encontro Nacional de Física de Partículas e Campos – Angra dos Reis (RJ), October 1994;
17. “Preliminary Results on the Pseudo-rapidity Dependence of the Muon Production Cross Section”, DØ General Collaboration Meeting, Batavia (IL), September 1993;
18. “Measuring Muon Production Cross Section in DØ Muon System Endcaps”, DØ General Collaboration Meeting, State University of New York at Stony Brook (EUA), June 1993;
19. “Study of the Doubly Cabibbo-Suppressed Decay  $D^+ \rightarrow \phi K^+$  and the Singly Cabibbo-Suppressed Decay  $D_s^+ \rightarrow \phi K^+$ ” – Workshop on Heavy Flavor Physics (I LISHEP, Session C) – Rio de Janeiro (RJ), February 1993;
20. “Experimental analysis of weak decays  $D^+ \rightarrow \phi K^+$  and  $D_s^+ \rightarrow \phi K^+$ ” (translated title), XI Encontro Nacional de Física de Partículas e Campos – Caxambú (MG), September 1990;
21. “Decays of Charmed Mesons  $D^+$  and  $D_s^+$  into  $\phi K$  Final States”, I Gleb Wataghin School on High Energy Phenomenology – Campinas (SP), February 1990;