Curriculum Vitæ

John Apostolakis

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POSITIONS

Staff member, CERN (IT Div. 1996-2003, PH/SFT 2003-present)	1996-present
Leader of CERN Geant4 team	1999-present
Geant4 Spokesperson	11/1999-7/2010
Chair of Technical Steering Board/Steering Board	11/1999-7/2010
Geant4 Geometry Working group coordinator	1996-1999
Fellow, Computing and Networking Division CERN	1993-1996
Parallel applications on SP-2, (CN/PDP group and IBM)	1995-1996
Esprit project GP-MIMD/2 in CN/ASD group	1993-1995

EXPERIENCE

GEANT4 Spokesperson and Chair of (Technical) Steering Board: Have been spokesperson and chair of the (Technical) Steering Board (TSB, 11/99-2005; SB 2006-2010) of the Geant4 Collaboration. Coordinate the effort of fifteen working groups, which organise the effort in diverse technical and software life-cycle areas. Represent Geant4 to LHC/HEP/other experiments, users in other domains, and potential contributors. Present the status of Geant4 to varied audiences, including conferences, workshop and experiment meetings. Enable the collective effort of 80-100 contributors, physicists and computing specialists; most are from twelve signing institutions, while others are member researchers. Lead the definition and tracking of goals and milestones, and ensure the resolution of issues, both technical and related to people. Seek new collaborators and expertise in key areas, and guide the accession of new groups. Report on the progress in achieving objectives and on the manpower level and issues to the Geant4 Oversight Board (OB). Catalyse the creation of release plans for Geant4, and oversee the work of the release coordinator and testing team. Ensure that publications are undertaken of key innovations, and reports presented of new functionality, validation and new or improved physical models at conferences. During 2003-05 took a leading role with Richard Mount in drafting new collaboration agreement, and achieved the agreement of member institutions and individual members. Led the process for the agreement of the Geant4 license in 2006 by copyright holders (institutions and individuals.) Undertaken leading role in organising several meetings, including Geant4 Users Workshops, Tutorials and Geant4 Collaboration meetings (Workshops). Plan for succession of important roles, to ensure maintenance, support and continuity in development.

Lead the Simulation Section of IT/API, then the Geant4 team of PH/SFT: Oversee and

plan key aspects of the work of staff, associates, fellows, visitors and students. Enable and guide their contribution in diverse areas of Geant4, including our major development areas in the physics modeling and geometry, and in vital support areas, including software management, system integration testing, tools for problem reporting, and quality assurance. Follow the physics and fucntionality requirements of the LHC/CERN experiments. Foresee and plan for future needs in physics precision, robustness and computing performance. Ensure the extension of the coverage and depth of the validation of physics models relevant for LHC/CERN. Foresee the evolution of expertise required in important areas, within the group and in Geant4. Plan long-term shift of effort to critical areas, such as hadronic physics, code maintenance and improvement, and physics and release validation. Identify commonalities in tools, and plan the migration to use tools in common with other SFT projects including in testing, performance improvement, and quality assurance. Undertook the coordination of support (1997-99) of the legacy GEANT 3.21.

Coordinator, contributor Geant4 Geometry Working Group: Coordinated (10/1996-1999) the Geometry and Transport Working Group of Geant4 in the development of improved detector description methods and refinements in navigation. Developed module for propagation of particles in an arbitrary field, with attention to the case of a magnetic field. Contribute to refinements and evolution of functionality in related working groups: tracking, parameterisation and electromagnetic physics. Continuing to contribute to the maintenance, support and refinement of the geometry module. Presented variety of topics at Tutorials, including the use of detector simulation, topics of geometry, propagation in field, tracking, event biasing, optical processes at Geant4 Tutorials (2002-2008). Lecturer at European School of Medical Physics, 2001-2008.

Parallelism for HEP: Developed parallelisation of the GEANT 3.21 simulation package with work sharing at the event level using MPI. Ported the simulation of four CERN experiments to distributed memory MIMD parallel computers for extended productions. Provided expertise on data parallel and message passing methods. Contributing to ongoing design of prototypes for use of multi-core machines for simulation using Geant4 using multi-processing and multi-threading.

TECHNICAL SKILLS

Presentations: Make frequent presentations on overview and status of the Geant4 toolkit, introductions to Geant4 and its applications, aspects of its geometry module. Target particular interests of diverse audiences while communicating important project achievements and goals.

Object Oriented Software Engineering: Undertake the user requirement collection, analysis, design and implementation, for example in a propagation module for the Geant4 toolkit. Participate in evolution and review of Geant4 architecture. Created designs in Rational **Rose**, utilising Booch and UML.

Programming: Fluent in **C++**, and **C** in scientific programs. Conversant in **Fortran**. Developed parallel programs using message passing, using **MPI** and precursors. Written programs in **data parallel** C* on CM-2.

Software Process: Review the **software life-cycle** processes of Geant4, and enable the

assessment and improvement of the software process. Participate in the creation of new policies and tools, *e.g.*in the definition of the system integration testing suite, and customising the problem reporting system and the code development tracking tool.

Algorithms and Parallelism: Created new algorithms for integration of motion of charged particles in smooth, near uniform, magnetic fields. Developed fast **Monte Carlo** simulations of lattice spin systems, optimising **scalable** vector algorithms. Devised fast component labeling algorithms for SIMD architectures. Modelled gravitational lenses with unpredictable flow of data and uneven computational load.

Tools: Experienced in use of Office programs (Powerpoint, Word, Excel), cvs, TEX and shell tools, e.g. tcsh, perl, make, awk. Experienced in use of profiling tools for identifying hotspots and the key methods of complex applications.

EDUCATION

Ph.D.	California Institute of Technology	*Physics*	1993

Thesis: *"Asymptotic Scaling in the O(3) Non-linear Sigma Model in Two Dimensions:* A Monte Carlo investigation on Parallel computers."

Advisor: *Geoffrey C. Fox.*

M. Sc.	California Institute of Technology	*Physics*	1992
Ptychion	University of Athens, Greece	*Physics*	1985

REFERENCES

John Harvey, PH Department, Mailbox E21210, CERN, Geneva, Switzerland.
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Richard Mount, SLC National Accelerator Center, Menlo Park, CA, USA.
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Albert De Roeck, PH Department, Mailbox E24710, CERN, Geneva, Switzerland.
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OTHER

Languages: Mother tongue: English. Native speaker of Greek. Good French (speaking and reading).

Avocations: softball, skiing, chess, football, cycling.

Citizenship: Citizen of the Hellenic Republic (Greece) and of the United Kingdom.