Felipe Moura de Carvalho

Ph.D, computer science - 3D visualization

https://www.felipedecarvalho.com
https://github.com/felipeCeler
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Specialities: *computer graphics, illustrative visualization, mesh processing, scientific visualization, GPU programming, HCI, image processing, point-cloud processing*

Technologies: *C/C++, Qt, OpenGL/GLSL, Python, CUDA, CMake, CGAL, git, Linux, Windows*

Working Experience

University of Calgary — Calgary, AB, Canada

Postdoctoral Researcher - Rapid Reservoir Modelling consortium — July, 2015 - June, 2019

- Created the initial sketch-based interface and modelling infrastructure to kick up the project.
- Integrated the Flow Diagnostic reservoir simulator.
- Implemented the post processing 3D visualization (OpenGL/GLSL) and the graphical user interface (Qt).
- Deployed and presented the prototype to the sponsors in the annual meetings.
- Implemented a 3D geologic mesh viewer to aid the modelling process using interactive illustrative visualization techniques.

Education

Federal University of Rio de Janeiro — Rio de Janeiro, RJ, Brazil

Institute Alberto Luiz Coimbra of Graduation and Research in Engineering (COPPE) — 2010 - 2014
Ph.D. in System Engineering and Computer Science (Computer Graphics)
Thesis: *Interactive Cutaway Rendering of Corner-Point Models*

Federal University of Rio de Janeiro — Rio de Janeiro, RJ, Brazil

Institute Alberto Luiz Coimbra of Graduation and Research in Engineering (COPPE) — 2007 - 2010
M.Sc. in System Engineering and Computer Science (Computer Graphics)
Thesis: *Renderização de Pontos usando Multiresolução (in portuguese)*

Federal University of Piauí — Teresina, PI, Brazil

Department of Computer Science and Statistics — 2010 - 2014
B.Sc. in Computer Science
Final Project: *Inteligência Artificial usando Linguagem Haskell (in portuguese)*

Research Visits

Computer Science Department, *illustrares Group*, University of Calgary, Canada — Dec, 2012 - Dec, 2013
Research on illustrative visualization of Oil and Gas reservoir models

Professional Service

Program Committee, Reviewer - IEEE Virtual Reality 2019

Projects

Interactive Cutaways of Oil Reservoir 2012 - 2014

In this project, I have implemented an Interactive Cutaways method strong relying on screen-space GPU techniques, specially designed for inspecting 3D reservoir models represented as corner-point. Alongside, I also adapt some illustrative techniques to increase the spatial relationship among the internal primitives

Project Page: https://doi.org/10.1016/j.gmod.2016.02.001

The Digital Bamberg Project 2010 - 2021

The Digital Bamberg project was a joint collaboration between the Computer Graphics Lab at PESC/UFRJ, and the Museum of Astronomy and Related Sciences (MAST). It combined the challenges of creating a digital replica of a scientific instrument, that, at the same time, is part of the museum collection and, hence, is treated as an historical artifact. In the project, I have assisted development and design software and algorithms for the 3D digitization process, which include the acquisition of the 3D geometry, by a laser scanner, and the registration of high quality images, acquired by a professional DSLR camera, of a historic scientific instrument.

Project Page: https://www.lcg.ufrj.br/bamberg/

React Bar 2008

During the imedia workshop, I have Implemented the software prototype *React Bar*. A collaborative effort in conjunction with designer, as part of the workshop of Interactive Media and Natural Interfaces promoted by Visgraf at the Institute for Pure and Applied Mathematics. The workshop focused on topics related with recent advances in tangible user interfaces (TUI), multitouch interaction, computer graphics, image processing, sound synthesis and new authoring environments. The idea of *React Bar* is to use multitouch interaction and tangible interface for entertainment in public spaces, exploring the concept of social networking. It has a simple and intuitive interface, in a fun use experience. It promotes a real interaction among users, starting it in a virtual way.

Project Page: https://www.visgraf.impa.br/imedia08/projects/reactbar.html

Invited Talks

Invited Speaker: CINCIT - Segundo Congreso Internacional de Computación e Innovación tecnológica. Sept, 2019
Andahuaylas - Apurímac - Perú.
Title: *Smart Visibility Applied to Oil&Gas Reservoir Models*

Impa Seminar - Computer Graphics May, 2014
Rio de Janeiro, RJ, Brazil
Title: *Renderização Interativa de Cutaways em Modelos de Reservatório de Petróleo (in portuguese)*

Impa Seminar - Computer Graphics April, 2010
Rio de Janeiro, RJ, Brazil
Title: *Simplificação e Multiresolução em Modelos baseados em Pontos (in portuguese)*

Honor and Awards

The National Council for Scientific and Technological Development (CNPq) - Brazil Scholarship granted by CNPQ Brazil to spend one year at the University of Calgary as visiting Ph.D Student (Grant no. 237044/2012-9)

Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro - FAPERJ - March 2012 Bolsa Nota 10: Scholarship granted by FAPERJ **with the purpose of rewarding the best graduate students** in the state of Rio de Janeiro, Brazil. (Grant no. E-26/100.393/2012)

The National Council for Scientific and Technological Development (CNPq) - Brazil Scholarship granted by CNPQ Brazil for pursuing a Ph.D at COPPE/UFRJ (Grant no. 141232/2010-2)

The National Council for Scientific and Technological Development (CNPq) - Brazil Scholarship granted by CNPQ Brazil for pursuing a M.Sc at COPPE/UFRJ (Grant no. 132345/2007-2)

Open Source

contributed to ***pymt*** - multitouch framework for python - https://github.com/tito/pymt
Now ***kivy*** - https://github.com/kivy

contributed to ***Tucano*** - opengl wrapper and computer graphics library - https://gitlab.com/lcg/tucano

Languages

Portuguese (Native)
English

Social Media

linkedin	https://www.linkedin.com/in/felipe-de-carvalho-1768173a/
github	https://github.com/felipeCeler
orcid	https://orcid.org/0000-0002-3690-5480
google scholar	https://scholar.google.com/citations?user=AlsjB1cAAAAJ&hl=en
cnpq lattes	http://lattes.cnpq.br/0922142294203200 *(in portuguese)*

Technical Skills

Main Skills	**computer graphics, illustrative visualization, mesh processing, scientific visualization, GPU programming**, point-cloud processing, graphics applied to cultural heritage, HCI, image processing,
Computer Programing Languages	**Cross-platform C++ development, across Windows and Linux, Python**, Haskell, Java, Html5, CSS
GPU	OpenGL/GLSL shader language, Nvidia CUDA
Libraries/API/Software	**Qt, Eigen, CGAL, CMake, git, OpenVolumeMesh**, svn, Point Cloud Library, OpenCV, Meshlab, Blender,Vtk, Inkscape, Gimp

Publication

Journal

Zhao Zhang, Sebastian Geiger, Margaret Rood, Carl Jacquemyn, Matthew Jackson, Gary Hampson, **Felipe Moura De Carvalho**, Clarissa Coda Marques Machado Silva, Julio Daniel Machado Silva, Mario Costa Sousa. Fast flow computation methods on unstructured tetrahedral meshes for rapid reservoir modelling. Computational GeoScience Journal. v. 23, p. 1573-1499, 2019.

Zhao Zhang, Sebastian Geiger, Margaret Rood, Carl Jacquemyn, Matthew Jackson, Gary Hampson, **Felipe Moura De Carvalho**, Clarissa Coda Marques Machado Silva, Julio Daniel Machado Silva, Mario Costa Sousa. A Tracing Algorithm for Flow Diagnostics on Fully Unstructured Grids With Multipoint Flux Approximation. SPE JOURNAL, v. 22, p. 1946-1962, 2017.

Felipe Moura de Carvalho, Emilio Vital Brazil, Ricardo Guerra Marroquim, Mário Costa Sousa, Antonio Oliveira, Interactive cutaways of oil reservoirs. Graphical Models, v 84, p 1-14, 2016

MARROQUIM, Ricardo, Pfeiffer, Gustavo,**CARVALHO, F. M** ., Oliveira, Antonio A.F. Texturing 3D models from sequential photos. The Visual Computer. , v.28, p.1 - 11, 2012.

Conference Papers

Zhang Z, Geiger S, Rood M, Jacquemyn C, Jackson M, Hampson G, **de Carvalho FM***, Machado Silva CCM*, Machado Silva J*, Costa Sousa M.* (2018). Fast Flow Computation Methods On Unstructured Tetrahedral Meshes For Rapid Reservoir Modelling. ECMOR XVI - European Conf. on the Mathematics of Oil Recovery Barcelona, Spain. 2018/09

Zhang Z, Geiger S, Rood M, Jacquemyn C, Jackson MD, Hampson GJ,**de Carvalho FM***, Machado Silva CC*, Silva JD*, Costa Sousa M.* (2017b). Flow Diagnostics on Fully Unstructured Grids. SPE Reservoir Simulation Conf. (RSC '17) - Session 12: Fast Simulation Methods and Next-Generation Simulator Development. Montgomery, TX, USA, 2017/02.

MP Rood, M Jackson, G Hampson, EV Brazil, **F de Carvalho**, C Coda, MC Sousa, Z Zhang, S Geiger. Sketch-based geologic modeling, AGU Fall Meeting Abstracts, 2015/12

MARROQUIM, Ricardo, PFEIFFER, G. T.,**CARVALHO, F. M**. , OLIVEIRA, A. A. F. Texturing 3D models with low geometric features In: XXVI Sibgrapi - Conference on Graphics, Patterns and Images, 2011, Maceio. Graphics, Patterns and Images (Sibgrapi). , 2011. p.1 - 8

FILHO, Z., **CARVALHO, F. M.**, BRAZIL, E. A. V., MARROQUIM, Ricardo, SOUSA, M. C. Cutaway Applied to Corner Point Models In: SIBGRAPI 2012 - WGARI (Workshop on Industry Applications), 2012, Ouro Preto. SIBGRAPI 2012 - WGARI (Workshop on Industry Applications). , 2012.

Poster with selection committee

MARROQUIM, Ricardo, **CARVALHO, F. M**. , DELLEPIANE, Matteo, OLIVEIRA, A. A. F. 3D Digitalization of Scientific Instruments The Case of the Bamberg Meridian Circle In: XXXI Symposium of the Scientific Instrument Commission, 2012, Rio de Janeiro. Proceedings of the XXXI Symposium of the Scientific Instrument Commission.

André Maximo, Maria Paula Saba, Joana Passi, Ricardo Castañeda Marin, Fernando Ribeiro, Rodolfo Lima, Alexandra Alves, Patrik Matos, Erick Passos, Nina Paim, **Felipe Moura**, Luisa Fosco, Ilana Paterman, Marcelo CIcconet, and Luiz Velho Interactive Media and Natural Interfaces In: Electronic Language International Festival, 2009, São Paulo. FILE SYMPOSIUM. , 2009

CARVALHO, F. M.; OLIVEIRA, A. A. F ; MARROQUIM, Ricardo . Level of Detail for Point Model Rendering. In: XXI Brazilian Symposium on Computer Graphics and Image Processing, 2008, Campo Grande. Proceedings of the XXI SIBGRAPI, 2008.