Chaulio Ferreira

PhD candidate at the Technical University of Munich
http://github.com/chaulio/CV

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chauliof@gmail.com
chaulio.ferreira@tum.de

About

PhD candidate at the Chair for Scientific Computing of the Technical University of Munich since 2015. Working on performance optimization of PDE engines with parallel adaptive mesh refinement, especially on Riemann solvers for the shallow water equations. Has worked in research in the following fields: Design and Analysis of Algorithms; Data Structures; Geographical Information Science; High Performance Computing.

Education

- **Technical University of Munich** — Munich, Germany
  PhD candidate at the chair for Scientific Computing — *Oct 2015 – ongoing*
  - Title: *Vectorization of Riemann solvers for the single- and multi-layer shallow water equations*
  - Supervisor: Michael Bader

- **Columbia University** — New York, USA
  Visiting scholar — *Sep 2017 – Nov 2017*
  - Guest at the Department of Applied Physics and Applied Mathematics
  - Supervisor: Kyle T. Mandli

- **Federal University of Viçosa** — Viçosa, Brazil
  Master's degree in Computer Science — *Mar 2012 - Feb 2014*
  - Title: *Visibility maps in large terrains represented by regular grids*
  - Supervisor: Marcus Vinicius Alvim Andrade
  - Co-supervisor: Salles Viana Gomes de Magalhães

- **Federal University of Viçosa** — Viçosa, Brazil
  Bachelor's degree in Computer Science — *Mar 2008 - Jan 2012*
  - Final project: *An interactive system to site observers in terrains represented by digital elevation models*
  - Supervisor: Marcus Vinicius Alvim Andrade

Professional Activities

- **Federal University of Viçosa** — Viçosa, Brazil
  Lecturer at the Department of Informatics — *Apr 2014 – Jul 2015*
  - Courses:
    * (INF 100) Introduction to programming I
    * (INF 101) Introduction to programming II
    * (INF 110) Programming I
    * (INF 213) Data structures
    * (INF 390) Computer graphics
    * (INF 492) Programming challenges

Skills

- **Languages:** Fluent in English and Portuguese. Basic knowledge of German and Spanish.
- **Development:** C/C++, Fortran, Python, Java.
- **High Performance Computing:** MPI, OpenMP, vectorization, CUDA.
- **Other:** Git, OpenGL, Linux, Windows, LaTeX.

Awards

- Best paper award at the XIV Brazilian Symposium on Geonfirmatics – "A parallel sweep line algorithm for visibility computation" (Brazilian Institute of Spatial Research, 2013).
- Honor certificate for Excellent Academic Performance (Federal University of Viçosa, Brazil, 2012).
- Silver Medal at the 1st Programming Marathon of the State of Minas Gerais, Brazil (Brazilian Computing Society, 2012)
- Fourth place at the 7th Marathon of Parallel Programming (Technical Committee on Computer Architecture and High Performance Computing – Brazilian Computing Society, 2012).
- First place at the regional stage of the International Collegiate Programming Contest (Juiz de Fora, Brazil, Association for Computing Machinery, 2012).
- 28th place at the national stage of the International Collegiate Programming Contest (Londrina, Brazil, Association for Computing Machinery, 2012).
- Second place at the 6th Marathon of Parallel Programming (Technical Committee on Computer Architecture and High Performance Computing – Brazilian Computing Society, 2011).
- First place at the 2nd GPU Programming Contest (Technical Committee on Computer Architecture and High Performance Computing – Brazilian Computing Society, 2011).
- First place at the regional stage of the International Collegiate Programming Contest (Juiz de Fora, Brazil, Association for Computing Machinery, 2010).
- 25th place at the national stage of the International Collegiate Programming Contest (Joinville, Brazil, Association for Computing Machinery, 2012).

Publications

Journal papers:

1. **C. R. Ferreira**, M. V. A. Andrade, S. V. G. Magalhães, and W. R. Franklin, "**An efficient external memory algorithm for terrain viewshed computation**," *ACM Transactions on Spatial Algorithms and Systems*, vol. 2, no. 2, **2016**
2. **C. R. Ferreira**, M. V. A. Andrade, S. V. G. Magalhães, W. R. Franklin, and G. C. Pena, "**A parallel algorithm for viewshed computation on grid terrains**," *Journal of Information and Data Management*, vol. 5, no. 2, **2014**

Conference papers:

1. **C. R. Ferreira**, K. T. Mandli, and M. Bader, "**Vectorization of Riemann solvers for the single- and multi-layer shallow water equations**," in *HPCS 2018 (The 2018 International Conference on High Performance Computing & Simulation)*. IEEE, **2018**
2. **C. R. Ferreira** and M. Bader, "**Load balancing and patch-based parallel adaptive mesh refinement for tsunami simulation on heterogeneous platforms using Xeon Phi coprocessors**," in *Proceedings of the Platform for Advanced Scientific Computing Conference*. ACM, **2017**
3. G. C. Pena, S. V. G. de Magalhães, M. V. A. Andrade, W. R. Franklin, **C. R. Ferreira**, and W. Li, "**An efficient GPU multiple-observer siting method based on sparse-matrix multiplication**," in *3rd ACM SIGSPATIAL International Workshop on Analytics for Big Geospatial Data*. ACM, **2014**
4. G. C. Pena, M. V. A. Andrade, S. V. G. de Magalhães, W. R. Franklin, Ferreira, and **C. R. Ferreira**, "**An improved parallel algorithm using GPU for siting observers on terrain**," in *16th International Conference on Enterprise Information Systems*, **2014**
5. **C. R. Ferreira**, M. V. A. Andrade, S. V. G. de Magalhães, W. R. Franklin, and G. C. Pena, "**A parallel sweep line algorithm for visibility computation**," in *XIV Brazilian Symposium on Geoinformatics*, **2013**
6. G. C. Pena, S. V. G. de Magalhães, M. V. A. Andrade, and **C. R. Ferreira**, "**Parallel algorithm using GPU for siting observers in terrains**," in *XIV Brazilian Symposium on Geoinformatics*, **2013**, original title (in Portuguese): "Algoritmo paralelo usando GPU para o posicionamento de observadores em terrenos"
7. **C. R. Ferreira**, M. V. A. A. Salles V. G. de Magalhães, W. R. Franklin, and A. M. Pompermayer, "**More efficient terrain viewshed computation on massive datasets using external memory**," in *20th International Conference on Advances in Geographic Information Systems*. ACM, **2012**
8. V. V. Jacob, **C. R. Ferreira**, and R. Ferreira, "**GPU optimization techniques applied to scale-free gene regulatory networks based on threshold function**," in *13th Symposium on Computer Systems (WSCAD-SSC 2012)*. Petrópolis, RJ: IEEE, **2012**
9. **C. R. Ferreira**, M. V. A. Andrade, S. V. G. de Magalhães, and A. M. Pompermayer, "**An efficient approach for viewshed computation in terrains stored in external memory**," in *XXXIX Seminário Integrado de Software e Hardware (SEMISH 2012)*, **2012**, original title (in Portuguese): "Uma abordagem eficiente para o cálculo de viewshed em terrenos armazenados em memória externa"

10. **C. R. Ferreira**, S. V. G. de Magalhães, and M. V. A. Andrade, "**An interactive system for siting observers in terrains represented by digital elevation models**," in *XII Brazilian Symposium on Geoinformatics*, Campos do Jordão, SP, **2011**, original title (in Portuguese): "Sistema interativo para posicionamento de observadores em terrenos representados por modelos digitais de elevação"
11. S. V. G. de Magalhães, M. V. A. Andrade, and **C. R. Ferreira**, "**Heuristics to site observers in a terrain represented by a digital elevation matrix**," in *XI Brazilian Symposium on Geoinformatics*, **2010**

Scientific talks

1. "Vectorization of Riemann Solvers for the Shallow Water Equations with One and Two Layers", at the *13th World Congress on Computation Mechanics* (WCCM 2018), in New York, USA, 2018.
2. "Vectorization of Riemann solvers for the single- and multi-layer shallow water equations", at the *2018 International Conference on High Performance Computing & Simulation* (HPCS2018), in Orléans, France, 2018.
3. "Load balancing and patch-based parallel adaptive mesh refinement for Tsunami simulation on heterogeneous platforms using Xeon Phi coprocessors", at *Platform for Advanced Scientific Computing* (PASC2017), in Lugano, Switzerland, 2017.
4. "Performance and Time to Solution of Dynamically Adaptive Tsunami Simulations", at *SIAM Conference on Computational Science and Engineering* (SIAM CSE 2017), in Atlanta, USA, 2017.
5. "Dynamically adaptive tsunami simulations on Xeon Phi architectures", at *Congress of the Italian Society of Industrial and Applied Mathematics* (SIMAI 2016), in Milan, Italy, 2016.
6. "A parallel sweep line algorithm for visibility computation", at *XIV Brazilian Symposium on Geoinformatics* (GeoInfo 2013), in Campos do Jordão, Brazil, 2013.
7. "GPU optimization techniques applied to Scale Free Gene Regulatory Networks based on Threshold Function", at *13th Symposium on Computer Systems* (WSCAD-SSC 2012), in Petropolis, Brazil, 2012.