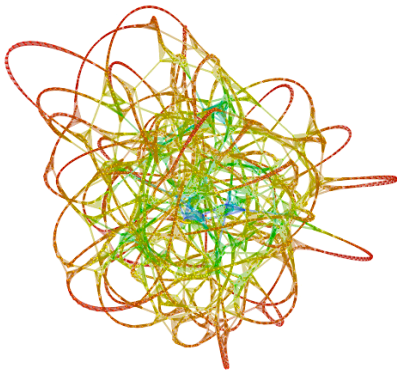
Filipi Nascimento Silva

- Researcher
- Data scientist
- Software developer



Bachelor, Master and Ph.D. in computational physics from the São Carlos Institute of Physics (University of São Paulo). Currently holding a post-doc position at the same institute. Have experience with the analysis of *complex systems*, *data visualization*, *scientific publication*, *framework development* and *web development*. Published papers on indexed international scientific journals and developed new *scientific applications* and *frameworks*. Interested in modeling and analyzing complex systems by using complex networks and visualization techniques on a wide range of scientific areas such as: *bioinformatics*, *text analysis*, *scientometry*, *information science* and *urban networks*.

Current position

Postdoctoral fellow at São Carlos Institute of Physics (University of São Paulo) since 2015

Contact Information

São Carlos Institute of Physics
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Languages

Portuguese (native) and English

Citezenship

Brazilian

Education

Postdoctoral fellow, *Speciality: Computational Physics* (2015 - now)
São Carlos Institute of Physics (University of São Paulo)

Ph.D in Physics, *Speciality: Computational Physics* (2011 - 2015)
São Carlos Institute of Physics (University of São Paulo)

Master in *Computational Physics* (2007 - 2009)
São Carlos Institute of Physics (University of São Paulo)

Bachelor in Physics, *Speciality: Computational Physics* (2003 - 2006)
São Carlos Institute of Physics (University of São Paulo)

PROFILES

Linkedin: http://linkedin.com/in/filipinascimento

ResearchGate: https://www.researchgate.net/profile/Filipi_Silva2

Scholar: https://scholar.google.com.br/citations?user=fhWJEysAAAAJ

ResearcherID: C-7620-2012

METRICS

17 publications in indexed journals

2 book chapters

65 citations (Web of Science)

58 citations (SCOPUS)

220 citations (Google Scholar)

EXPERIENCE

Postdoctoral Fellow
2015 - now

São Carlos Institute of Physics (University of São Paulo)

Contract: Academic - full time (grants by FAPESP)

Currently studying *complex networks* methods applied to a diverse range of datasets, such as texts, cities, financial market and biological systems. Also developing new web-based tools and *libraries* for *network analysis* and *visualization*, as well as new *theoretical approaches* in complex networks.

Supervision: Luciano da Fontoura Costa.

iOS and Web Developer
2009 - now

Individual

Contract: none (freelancer)

Acting as freelancer consultant of iOS technologies and developer. Started developing an *entertainment* and *visualization library* for iOS devices written in *Objective-C* and using *OpenGL ES* library. Working with numerical 3D geometry and computational graphics. Currently developing an iOS game called *Gridland*. Notable clients: Paperless, G-Technologies and Rádio Eldorado.

Data Scientist
2015 - 2015

Bike da Firma (www.bikedafirma.com/en)

Contract: none (freelancer)

Worked as a freelancer consultant and developer of *data science* solutions for Bike da Firma. Conceived and implemented *classification techniques* employed to *extract patterns* of information retrieved from mobile devices, such as *geolocation* and *accelerometer data*.

Experience (cont.)

Ph. D Thesis São Carlos Institute of Physics (University of São Paulo)
2011 - 2015 Contract: Academic - full time (grants by CAPES)

Studied the *multidimensional structure* of *complex networks* such as *fractals* and high dimensional geographic networks. Also developed new *web-based* tools for *network analysis*.
Supervision: Luciano da Fontoura Costa.

Master Thesis São Carlos Institute of Physics (University of São Paulo)
2007 - 2009 Contract: Academic - full time (grants by CNPq)

During my master's, I continued to focus my study on *complex networks*, now applied to data analysis, such as a dataset of mathematical theorems from Wikipedia and the USP's collaboration network. Improved the *network framework* written in *C* and *Objective-C* languages. Also started the development of an advanced *complex network visualization software* (*Networks 3D*).

I also vastly improved my knowledge of *Java*, *C* and *Objective-C* programming languages, as well advanced software development methods, e.g. *coding patterns* and *code optimization*. *Developed* applications using advanced libraries and tools, such as OpenGL, LAPACK, CoreFoundation and Cocoa.

Worked in *collaboration* with colleagues and published full papers in indexed international journals.
Supervision: Luciano da Fontoura Costa.

Scientific Initiation São Carlos Institute of Physics (University of São Paulo)
2005 - 2006 Contract: Academic - partial time (Grants by CNPq)

Studied the *multi-scale structure of complex network* derived from complex systems by means of hierarchical node-centered measurements. *Developed a framework* to obtain *Hierarchical (Concentric) properties* from complex networks and published an article in Journal of Statistical Physics.
Supervision: Luciano da Fontoura Costa.

Experience (cont.)

Scientific Initiation
2004 - 2005

São Carlos Institute of Physics (University of São Paulo)
Contract: Academic - partial time (grants by CNPq)
Ported *RoundMidnight - EXAFS Datafiting* software from Mac OS X to Windows.
Supervision: Valmor Roberto Mastelaro and Alain Michalowicz

Teaching experience

Assistant teacher internship (Programa PAE) - 2014
Grants by CAPES
São Carlos Institute of Physics (University of São Paulo)
Course: Mathematical and Computational Modeling
Duration: 120 hours
Supervision: Prof. Luciano da Fontoura Costa

Conducted the workshop: Introduction to Interactive Visualization of Data and Complex Networks
5a Semana da Física
São Carlos Institute of Physics (University of São Paulo)

Study aboard

Visiting researcher at Northeastern University, USA, 2016
Duration: 1 week. Supervision: *Prof. Barabási Albert-László*

Visiting researcher at Boston University, USA, 2016
Duration: 1 week. Supervision: *Prof. Eugene H. Stanley*

Visiting researcher at Krasnow Institute (GMU), USA, 2016
Duration: 1 week. Supervision: *Giorgio Ascoli*

Visiting student at Harvard Medical School, USA, 2012
Project: Local dimension analysis of biological structures
Duration: 1 week. Supervision: *Prof. Xiaoyin Xu*

Visiting student at Boston University, USA, 2012
Project: Visualization of bank transactions network
Duration: 2 weeks. Supervision: *Prof. Eugene H. Stanley*

Featured publications

Silva, F. N.; Amancio, D. R.; Bardosova, M.; Oliveira Jr., O. N.; Costa, L. da F.
Using network science and text analytics to produce surveys in a scientific topic. *Journal of Informetrics*, v. 10, n. 2, p. 487 – 502, 2016.
doi: 10.1016/j.joi.2016.03.008

Silva, F.N.; Comin, C.H.; Peron, T.K.DM. ; Rodrigues, F.A.; Ye, C.; Wilson, R.C.; Hancock, E.R. and Costa, L. da F.
Concentric network symmetry. *Information Sciences*, Volume 333, p. 61-80, 2015.
doi: 10.1016/j.ins.2015.11.014

Moreira-Filho, C. A.; Bando, S. Y.; Bertonha, F. B.; Silva, F. N.; Costa, L. da F.; Ferreira, L.; Furlanetto, G.; Chacur, P.; Zerbini, M. C.; Carneiro-Sampaio, M.
Modular Transcriptional Repertoire and MicroRNA target Analyses Characterize Genomic Dysregulation in the Thymus of Down Syndrome Infants. *Oncotarget*, v. 7, n. 11, p. 7497 – 7533, 2015.
doi: 10.18632/oncotarget.7120

Amancio, D. R.; Silva, F. N.; Costa, L. da F.
Concentric network symmetry grasps authors' styles in word adjacency networks. *Europhysics Letters*, v. 110, n. 6, p. 68001, 2015.
doi: 10.1209/0295-5075/110/68001

Bando, S. Y.; Silva, F. N.; Costa, L. da F.; Silva, A. V.; Pimentel-Silva, L. R.; Castro, L. H. M.; Wen, H.-T.; Amaro Junior, E.; Moreira-Filho, C. A.
Complex network analysis of CA3 transcriptome reveals pathogenic and compensatory pathways in refractory temporal lobe epilepsy. *PLoS ONE*, v. 8, n. 11, p. e79913, 2013.
doi: 10.1371/journal.pone.0079913

Costa, L. da F. and Silva, F. N.
Hierarchical characterization of complex networks *Journal of Statistical Physics*, v. 125, n. 4, p. 845-876, 2006.
doi: 10.1007/s10955-006-9130-y

Other publications

The complete list of my publications is available on my researcherID or Google Scholar profile:
http://www.researcherid.com/rid/C-7620-2012
https://scholar.google.com.br/citations?user=fhWJEysAAAAJ

Pre-prints and recent manuscripts can be found on arXiv:
http://goo.gl/gI5plq

Projects

Network visualization tools in WebGL
2013 - now

Ph.D thesis related

To improve the usefulness of our visualization tools we have started to port and rebuild some of our software for a web-based environment, mostly reimplementing them using technologies such as WebGL and HTML5. Initial results have shown to be promising because it allow us to balance the processing power of both client-side and server-side. Currently it can display graphically astounding complex networks on any recent major browser.

See the network visualizer in action:

Interdisciplinary map of science obtained from a journals network (video).
http://youtu.be/ipjTMy-RrvU

Gene expression map for people suffering from febrile epilepsy (video).
http://youtu.be/Trb67DoLf5U

Gene to gene network, also displaying the user interface of the software (video).
http://youtu.be/9Cz51sBbjOs

The software source code and demonstration can be found in:
http://filipinascimento.github.com/cgicmcprojects/networkviewer/index.html
or http://goo.gl/uwP7i

Networks 3D visualization tools
2008 - now

Ph.D thesis related

Networks 3D is a software under development, built to construct and interact with graphically appealing visualizations of large complex networks. Its main objective is to provide means for researchers and specialists to see and get a visual overview of the data they are working with. The tool is based on a optimized force-directed algorithm, which is used to project the networks to a 2D or 3D space, presenting results generated by the graphical processing unit in real-time.

More info at the software webpage:
http://goo.gl/QZflC

Projects (cont.)

Gridland
2011 - 2016
(on hold for now)

Mobile development related

Gridland is a game being developed by me and a friend, to be distributed initially on the App Store. It is a implementation of the famous Shannon switching machine where two players compete by securing or destroying links in a graph. We developed all aspects of the game including distinct levels of artificial intelligences to yield up to 3 levels of difficulty, 2 game modes and a 3D graphical interface on top of our HighSpace game engine. It was written entirely in C and Objective-C.

See a video of the pre-beta version in:
http://youtu.be/-ivf89Oh0VU

HighSpace game engine
2010 - 2011

Mobile development related

We developed a complete 3D graphical game engine on top of the Cocoa Touch frameworks and OpenGL ES. The capabilities of the engine include animated GUIs, 3D object loader, geometry representation, 3D particles engine, fast text rendering, dynamic texture atlas, keyframe animations, camera control, fast sprite rendering, etc.

Some features of the engine are shown in this video playlist:
http://www.youtube.com/playlist?list=PLFimqafBV-I5JvdrkczdCf73SKpBVN5fF
or http://goo.gl/8Rmt4

Other assignments

- Developed interactive visualizations of soccer games using data provided by researchers of UNICAMP (Prof. Ricardo Machado Leite de Barros):

  10000 game frames:
  http://cyvision.ifsc.usp.br/futebolTests/voronoi10000.html

  40000 game frames:
  http://cyvision.ifsc.usp.br/futebolTests/voronoi40000.html
  (the download of the data may take several minutes)

  Only events followed by team score:
  http://cyvision.ifsc.usp.br/futebolTests/voronoiFinalizacoes.html

- Developed a software to obtain symmetry and accessibility measurements of complex networks (2014).
  https://github.com/filipinascimento/CVAccessibility
  https://github.com/filipinascimento/CVSymmetry

Other assignments (cont.)

- Developed the facebook apps for two major radio stations in São Paulo/Brasil (Rádio Eldorado and Rádio Estadão) :
  https://www.facebook.com/radioeldorado/app_344923452275303
  https://www.facebook.com/RadioEstadao/app_492239080829149

- Created the website for the Cybernetic Vision Research Group (2012).
  http://cyvision.ifsc.usp.br/

- Developed a software to obtain concentric measurements of complex networks (2008).
  http://cyvision.ifsc.usp.br/concentric/

- Created a musical visualizer called HighParticles for iTunes, built using Quartz Composer.
  http://goo.gl/iozTl

Skills summary

- Can read and write software in many programming languages such as: *C*, *C++*, *Java*, *Objective-C*, *Python* and *Javascript*. In particular, modern C language programing, i.e. *C99* and *C11*, is my speciality. I also have some experience with the development of frameworks and libraries (see *HighSpace* and *CVAccessibility/CVSymmetry*). I also have high flexibility to learn and work with new programming languages.

- Have experience with *code analysis* and *debugging*. Including user-level knowledge of *memory management* techniques, such as checking for *leaks*, advanced *allocations and deallocation patterns*, *reference counting*, *garbage collector*, *retain/release cycles*. Also have some experience with code *profiling* and *optimization* based on time or memory.

- Can work with *parallel* and distributed computing on multiple machines or CPUs, encompassing libraries such as *OpenMP* and *OpenMPI*. Also have notions of *MapReduce* approach and *GPGPU* programming. (See *CVAccessibility/CVSymmetry* software).

- Have some knowledge of *GUI development* and advanced knowledge of *computer graphics*. (see *Gridland* and *Networks 3D*).

- Experienced with *machine learning* methods, including supervised and unsupervised *embedding and classification* techniques, such as *PCA*, *LDA*, K_{nn}, *SVM*. (See papers "A pattern recognition approach to complex networks" and "Concentric network symmetry grasps authors' styles in word adjacency networks").

SKILLS SUMMARY (CONT.)

- *Scientific Background*:
  - General and advanced *physics* knowledge.
  - Advanced *mathematical skills*.
  - Can work with advanced *numerical methods*.
  - Advanced computational *3D geometry* skills.
  - Advanced *data analysis* and *statistics* knowledge.
  - Can develop projects and content in a *team* of researchers.
  - Great skills and innovative mind to *tackle new problems*.

- Have some experience with *natural language processing*. This includes techniques to pre-process textual data, such as *lemmatization*, *tokenization* and *tf-idf*. Also have experience with the analysis of such a kind of data, including *topic modeling*, *semantic similarity* and *feature extraction*. (See papers "Concentric network symmetry grasps authors' styles in word adjacency networks", "Mesoscopic representation of texts as complex networks" and "Using network science and text analytics to produce surveys in a scientific topic").

- Have advanced knowledge of *network science* and in representing *arbitrary datasets* as *complex networks*. (See experience and education sections).

- Have skills to construct interactive *complex visualizations* of *arbitrary data*. (See soccer games visualization, network visualization tools in *WebGL* and my research papers).

- Have proven experience with the following *tools and software*:
  - iOS SDK.
  - Cocoa/CocoaTouch and Objective-C libraries, including UIKit and AppKit.
  - OpenGL 2.x, OpenGL ES 1.x/2.0 and OpenGL 3.2
  - Xcode.
  - LLVM/Clang compiler, GCC compiler and Intel's ICC compiler.
  - Knowledge of the Objective-C runtime and Cocoa frameworks internals.
  - Grand Central Dispatch, multi-threaded programming and blocks.

- *Web developer* with some experience in core technologies, such as HTTP, HTML5, CSS3, XML, JSON, WebGL, PHP, d3.js, Node.js and MongoDB.

- Other skills:
  - Remote versioning systems, such as *GIT*, *SVN*, *CVS* and others.
  - Advanced knowledge of *Mac OS X* and *Linux*, internals and applications.