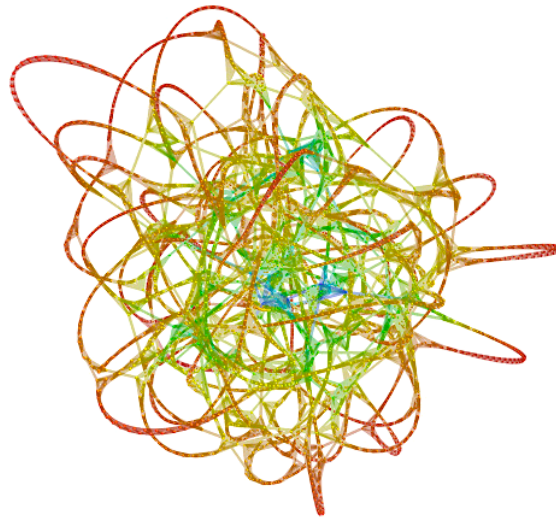


Filipi N. Silva Researcher • Data scientist • Software developer

Ph.D. in Computational Physics

Visiting Research Scholar at Indiana University



Hi!

I'm Filipi Nascimento Silva, Ph.D. in computational physics, currently working as a visiting research scholar at the School of Informatics, Computing and Engineering - Indiana University.

Experience

I've published papers and developed software on many scientific fields, including bioinformatics, text analysis, scientometry, information science, and urban networks. My current focus is in science of science and network visualization.

Research

My interests include developing and implementing new techniques for analyzing, modeling and understanding real-world systems through complex networks, machine learning and data visualization.

Future

I'm looking for opportunities around the world in which I can continue to develop my skills while also doing research on interdisciplinary topics or bringing amazing products to life. I'm interested in careers at the university, industry, or a combination of both.

Specs.

FULL NAME Filipi Nascimento Silva

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INFORMATION 919 E. 10th Street, Room 210
Bloomington, IN 47408
+1 (812) 325-0200
<https://filipinascimento.github.io>
filipinascimento@gmail.com

LANGUAGES Portuguese (native) and English

CITIZENSHIP Brazilian

EDUCATION 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)

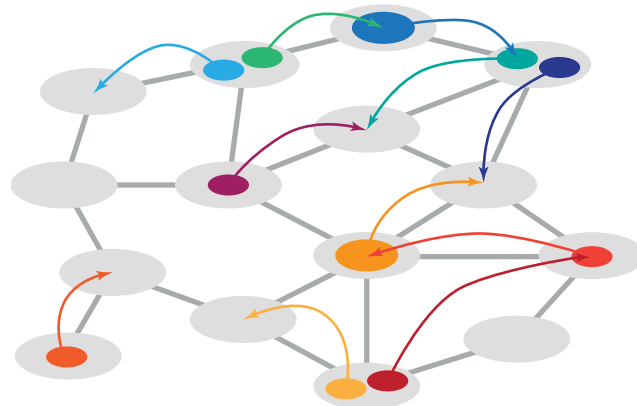
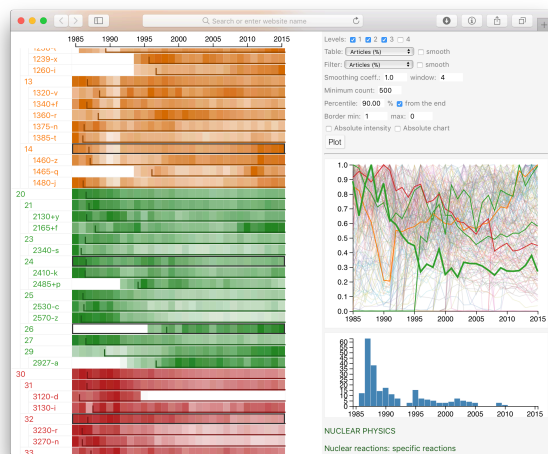
LINKEDIN <http://linkedin.com/in/filipinascimento>

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

GOOGLE SCHOLAR <https://scholar.google.com.br/citations?user=fhWJEysAAAAJ>

METRICS 24 publications in indexed journals
2 book chapters
95 citations (Web of Science)
113 citations (SCOPUS)
278 citations (Google Scholar)

Experience



Visiting Researcher

SICE¹ - Indiana University
2017 - now

Currently studying the evolution of scientific fields along time based on information coming from content (such as texts), citation networks and popularity metrics. Our main goal is to predict the emergence of new scientific fields and understand its dynamics. For that, we developed a web application to explore popularity time-series obtained for scientific fields and properties from citation networks.

Supervision: Filippo Menczer
(grants by FAPESP)

Postdoctoral Fellow

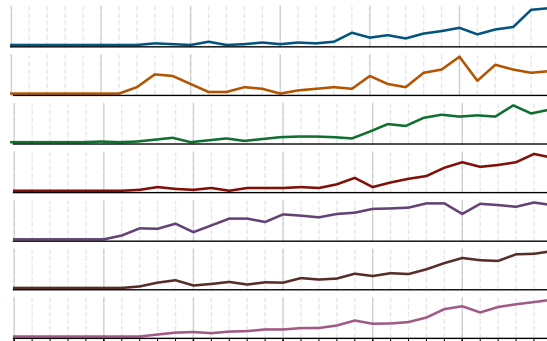
IFSC² - University of São Paulo (USP)
2015 - 2017 (paused)

Studying dynamics occurring or driving the evolution of *complex networks* along time for 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.

Advisor: Luciano da F. Costa
(grants by FAPESP)

1 - School of Informatics, Computing and Engineering
2 - São Carlos Institute of Physics

Experience



iOS and Web Developer

Freelancer
Since 2010

Acting as freelancer consultant developer of solutions for *iOS*. Started developing an *entertainment* and *visualization library* for iOS devices written in *Objective-C* and using *OpenGL ES*. Currently developing an iOS game called *Gridland*. Notable clients: Paperless¹, Gtechnologies and Rádio Eldorado².

Data Scientist

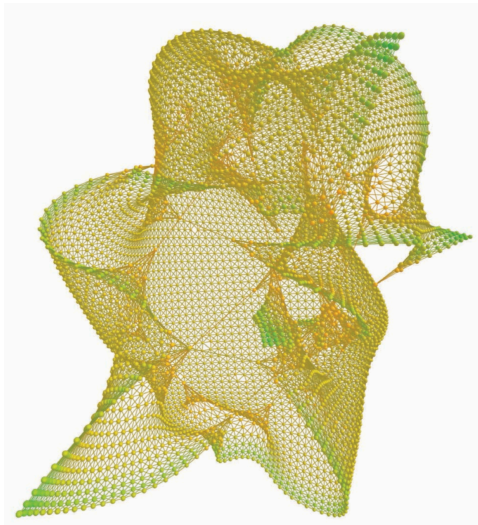
Freelancer for Bike da Firma
2015

Worked as a freelancer consultant and developer of *data science* solutions for Bike da Firma³. Conceived and implemented *classification techniques* employed to *extract patterns* of information retrieved from mobile devices, such as *geolocation* and *accelerometer data*.

Working as freelancer for industry vastly improved my practical knowledge of programming, in particular for Java, C, Objective-C and Python languages. I was properly introduced to coding patterns and optimizations techniques and started to use many libraries and frameworks, such as OpenGL, LAPACK, CoreFoundation and Cocoa.

- 1 - www.paperlessdobrasil.com.br
- 2 - www.facebook.com/radioeldorado/
- 3 - www.bikedafirma.com/en/

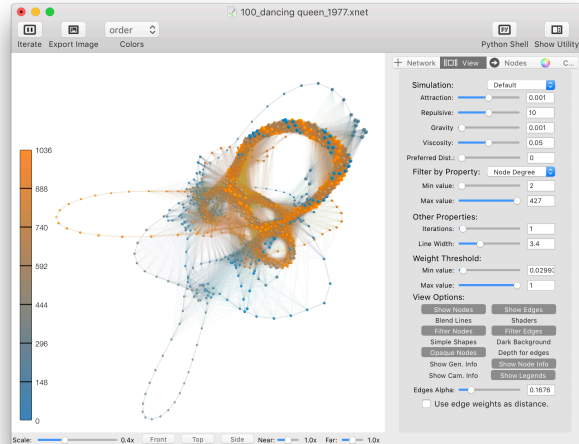
Experience



Ph.D. Thesis

IFSC - University of São Paulo (USP)
2011 - 2015

Studied the *multidimensional structure* of *complex networks* such as *fractals* and high dimensional geographic networks. We analyzed many real-world systems, such as gene to gene correlation networks, academic publication data and geographic networks. During this time I also improved and optimized the algorithms behind our network visualization tool. These developments resulted in a new version of the visualizer for the web. Advisor: Luciano da F. Costa (grants by FAPESP)



Master Thesis

IFSC - University of São Paulo (USP)
2007 - 2009

Developed new techniques based on *complex networks* interwoven with pattern recognition approaches *and applied them* to data analysis. Among the studied systems were: theorem network and collaboration networks. Also started the development of an advanced *complex network visualization software (Networks 3D)*. Advisor: Luciano da F. Costa (grants by FAPESP)

Experience

Scientific initiation Studied the multiscale structure of complex network derived from complex systems by means of hierarchical node-centered measurements.
IFSC - USP
2007 - 2009

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.
Advisor: Luciano da F. Costa
(grants by CAPES)

Scientific initiation Ported RoundMidnight - EXAFS Datafitting software from Mac OS X to Windows.
IFSC - USP
2004 - 2005

Advisors: Valmor R. Mastelaro and Alain Michalowicz
(grants by CNPq)

Misc. experience

TEACHING Assistant teacher internship (Programa PAE) - 2014

EXPERIENCE Grants by CAPES

IFSC - University of São Paulo

Course: Mathematical and Computational Modeling

Duration: 120 hours

Supervision: Prof. Luciano da F. Costa

Conducted the workshop: Introduction to Interactive
Visualization of Data and Complex Networks

5ª Semana da Física

IFSC - University of São Paulo

STUDY Visiting researcher at Northeastern University, 2016

ABOARD Duration: 1 week.

Supervision: Prof. Barabási Albert-László

Visiting researcher at Boston University, 2016

Duration: 1 week.

Supervision: Prof. Eugene H. Stanley

Visiting researcher at Krasnow Institute (GMU), 2016

Duration: 1 week.

Supervision: Giorgio Ascoli

Visiting student at Harvard Medical School, 2012

Duration: 1 week.

Supervision: Prof. Xiaoyin Xu

Visiting student at Boston University, 2012

Duration: 2 weeks.

Supervision: Prof. Eugene H. Stanley

Selected 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](https://doi.org/10.1016/j.joi.2016.03.008)

Silva, F. N.; Comin, C. H.; L. da F. Costa Seeking maximum linearity of transfer functions. *Review of Scientific Instruments*, v. 87, n. 12, p. 124701, 2016
doi: [10.1063/1.4969058](https://doi.org/10.1063/1.4969058)

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](https://doi.org/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](https://doi.org/10.18632/oncotarget.7120)

Silva, F. N.; Rodrigues, F. A.; Oliveira Jr., O. N.; Costa, L. da F. Quantifying the interdisciplinarity of scientific journals and fields *Journal of Informetrics*, v. 7, n. 2, p. 469--477, 2013
doi: [10.1016/j.joi.2013.01.007](https://doi.org/10.1016/j.joi.2013.01.007)

The complete list of my publications can be found in:

<https://filipinascimento.github.io/publications/>

<http://www.researcherid.com/rid/C-7620-2012>

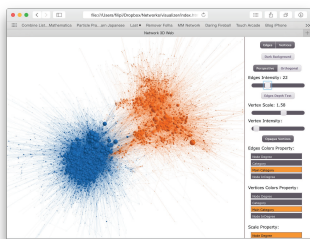
<https://scholar.google.com.br/citations?user=fhWJEysAAAAJ>

Pre-prints and recent manuscripts can be found on arXiv:

<http://goo.gl/gl5plq>

Projects

Network visualization tools for the web 2013 - now



To improve the usefulness of our visualization tools we started porting them to a new web-based environment. More specifically, we are reimplementing the visualizer using web technologies, such as WebGL and HTML5. Currently it can display graphically astounding complex networks visualizations on any recent major browser.

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).

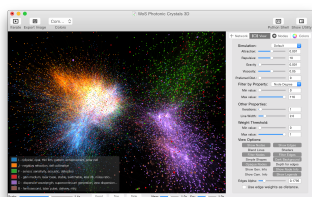
<http://youtu.be/Trb67DoLf5U>

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 2009 - now



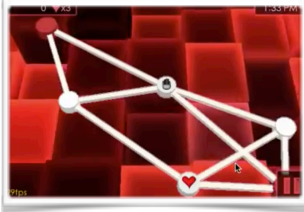
Networks 3D is a software under development, built to construct and interact with graphically appealing visualizations of large complex networks. Its main objective is to provide means for researchers and specialists to see and get a visual overview of the data they are working with. The tool is based 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://cyvision.ifsc.usp.br/software/networks3d>

Projects

Gridland 2011 - 2015
(temporarily on hold)



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 the artificial intelligence with 3 levels of difficulty and a 3D graphical interface. It was written entirely in C and Objective-C.

See a video of an early state version in:
<http://youtu.be/-ivf89Oh0VU>

HighSpace 2010 - 2011



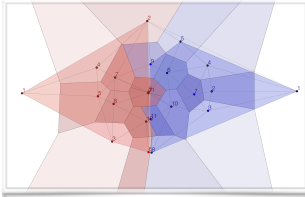
We developed a 3D scene engine on top of the Cocoa Touch frameworks and OpenGL ES. The capabilities of the engine include animated GUIs, 3D object loader, geometry representation, 3D particles engine, fast text rendering, dynamic texture atlas, keyframe animations, camera control, fast sprite rendering,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

Projects

Other assignments



Developed interactive visualizations of soccer games for data from Prof. Ricardo M. L. de Barros (UNICAMP)

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

Also developed software to obtain network metrics:

<https://github.com/filipinascimento/CVAccessibility>

<https://github.com/filipinascimento/CVSymmetry>

Developed the facebook apps for two major radio stations of 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/>

Skill set 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 programming, 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'm also very flexible in learning and working with another programming language.
- 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. I also have some experience using *2vec approaches to find good embeddings for data. (See papers "A pattern recognition approach to complex networks" and "Concentric network symmetry grasps authors' styles in word adjacency networks").
- Scientific Background:
 - General and advanced physics knowledge.
 - 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.

Skill set summary

- Have some experience with **natural language processing**. This includes techniques to pre-process textual data, such as **lemmatization**, **tokenization**, **tf-idf** and **embedding**. Also have experience with the proper analysis of text, 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, HTML5, CSS3, XML, JSON, WebGL, PHP, d3.js, Node.js and MongoDB.
- Remote versioning systems, such as **GIT**.