



# André Anjos

*Signal Processing Engineer, D.Sc.*

## Education

- 2001–2006 **Doctor**, Federal University of Rio de Janeiro, Brazil.  
D.Sc. degree from the Electronics Engineering School (Signal Processing Laboratory), Post Graduate Program (COPPE). Thesis work developed at CERN, Switzerland in the context of the ATLAS Experiment.
- 2000–2001 **Master**, Federal University of Rio de Janeiro, Brazil.  
M.Sc. degree from the Electronics Engineering School (Signal Processing Laboratory), Post Graduate Program of the Federal University of Rio de Janeiro (COPPE/UFRJ). Thesis work developed at the university in the context of the ATLAS-CERN/UFRJ collaboration.
- 1994–1999 **Engineer**, Federal University of Rio de Janeiro, Brazil.  
Electronics Engineering degree from the Electronics Engineering Department.
- 1989–1993 **Technician**, Federal Center of Technology, Rio de Janeiro, Brazil.  
Technical course in Electronics, taken at the same time as my high-school studies.

## Experience

- 2014–present **Scientific Collaborator**, Idiap Research Institute, Martigny, Switzerland.  
Research on Biometrics, Security and Computing.
- Teaching:**
- Fundamentals in statistical pattern recognition, post-graduate level, at the École Polytechnique Fédérale de Lausanne (EPFL, Switzerland), EE-612
  - Guest Lecturer at State University of São Paulo, Campus Bauru, for the master level course "Special Topics in Reproducible Research Pattern Recognition and Machine Learning", June 2015
- Supervision:**
- Co-supervision of Ivana Chingovska, doctorate student.
- Project writing and involvement:**
- FP7 BEAT: contact point for Idiap, leader on 2 work packages. BEAT develops a new open-source online platform for biometric system certification and development;
  - CTI Project FEDARS: face recognition using deep architectures;
  - Hassler Project COHFACE: remote photo-plethysmography (heart-rate measurements) from webcam images, application to face anti-spoofing;
  - CTI Project 3DFingerVein: vein recognition using a finger vein imagery acquired from multiple cameras;
  - Development and management of Bob, a framework for reproducible research in pattern recognition and machine learning.

- 2010–2013 **Post-doctoral Researcher**, Idiap Research Institute, Martigny, Switzerland.  
Research on Biometrics, Security and Computing.  
**Teaching:**
- o Fundamentals in statistical pattern recognition, post-graduate level, at the École Polytechnique Fédérale de Lausanne (EPLF, Switzerland), EE-612
- Supervision:**
- o Co-supervision of Ivana Chingovska, doctorate student;
  - o Co-supervision of Tiago Freitas Pereira and Jukka Mäatta, visiting students;
  - o Co-supervision of Murali Mohan Chakka, trainee.
- Project writing and involvement:**
- o FP7 BEAT: contact point for Idiap, leader on 2 work packages. BEAT develops a new online platform for biometric system certification and development;
  - o FP7 TABULA RASA: contact point for Idiap. TABULA RASA investigates sensitiveness to spoofing attacks on biometric systems;
  - o CTI Project Replay: development of database and counter-measures to spoofing. Construction of working prototypes with the industrial partner (KeyLemon);
  - o Development and management of Bob, a framework for reproducible research.
- 2004–2010 **Researcher**, University of Wisconsin, Madison, USA.  
Development and construction of the ATLAS Trigger and Data-Acquisition Systems, at CERN, Switzerland.  
**Supervision:**
- o Supervision of CERN summer students (three summers);
  - o Co-supervision Rodrigo Coura Torres, doctorate student.
- Achievements:**
- o Design, development and maintenance of the ATLAS Trigger and Data Acquisition systems. It is currently deployed and operational on more than 5000 machines at CERN and worldwide.
- 2000–2004 **Graduate Student**, Federal University of Rio de Janeiro, Brazil.  
Design and development of a novel algorithm for fast physics triggering based on Calorimetry, Topological Mapping and Neural Networks for the ATLAS Experiment, CERN, Switzerland.
- 1994–1999 **Under Graduate Student**, Federal University of Rio de Janeiro, Brazil (includes 1 year internship at CERN, Switzerland).  
Signal Processing student.  
**Achievements:**
- o Sub-optimal filtering for particle discrimination;
  - o Neural classifiers implemented in a transputer-based parallel machine;
  - o Spent 1 year at CERN, Switzerland in a joint project with the university. Participated in the development of early prototypes of the 2nd level-trigger and what would be become the final design of the trigger for the ATLAS experiment.

## Patents

- US20150970333 Method and internet-connected server for reviewing a computer-executable experiment (filed), cf. EU FP7 BEAT Project.
- WO2016053683 A data-network connected server, a device, a platform and a method for conducting computer-executable experiments (filed), cf. EU FP7 BEAT Project.

## Computer skills

- Operating Systems Proficiency in Linux (and other unixes), Mac OSX and Microsoft Windows
- Administration Advanced system and network management. Concepts of networking, firewalling, internet publishing, protocols and architectures
- Programming Advanced knowledge on several structured and object-oriented languages programming. Advanced knowledge on concurrent and parallel programming
- Software Management Advanced experience on building and integrating large software projects, managing releases and software policies, as well as working with collaboration tools for revision control, building, documenting and describe
- Databases Extensive experience with the use and development of databases

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## Languages

- Portuguese **Mater language.**  
English **Proficient**, Read, write and speak fluently.  
French **Proficient**, *certified C1-level*, Read, write and speak fluently.  
Spanish **Basic**, Basic communication skills, can read well.

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## Off-work

- Sports Alpine skiing, Biking, Tennis, Swimming  
Music Various percussion instruments and [brazilian cavaquinho](#)  
Computing Explore new techniques and tools

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## Quick remarks on publications

- H-Index = 18. See [my Google Scholar page](#)  
Articles ~30% are journals. I authored and co-authored more than 90 publications. I'm first author on ~25% of the publications listed on the next section.  
Most Cited The 2 most cited articles are collaboration articles from the ATLAS experiment, CERN. They are written by many authors and provide similar impact.  
Idiap The first article written by me while at Idiap has 112 citations (published on October 2011). It is my 3rd most cited work.  
Ph.D. The seventh most cited article (38 citations) corresponds to my Ph.D. thesis journal article.

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## Publications (reverse chronological order)

Ivana Chingovska, Nesli Erdogmus, André Anjos, and Sébastien Marcel. Face recognition systems under spoofing attacks. *Face Recognition Across the Imaging Spectrum*, 2016.

Ivana Chingovska and André Anjos. On the use of client identity information for face antispoofing. *IEEE Transactions on Information, Forensics and Security*, 10(4):787–796, August 2015.

André Anjos, Ivana Chingovska, and Sébastien Marcel. Anti-spoofing: Face databases. *Encyclopedia of Biometrics*, 2015.

Ivana Chingovska, André Anjos, and Sébastien Marcel. Anti-spoofing: Evaluation methodologies. *Encyclopedia of Biometrics*, 2015.

Ivana Chingovska, André Anjos, and Sébastien Marcel. Biometrics evaluation under spoofing attacks. *IEEE Transactions on Information, Forensics and Security*, August 2014.

Tiago de Freitas Pereira, Jukka Komulainen, André Anjos, José Mario De Martino, Abdenour Hadid, Matti Pietikainen, and Sébastien Marcel. Face liveness detection using dynamic texture. *EURASIP Journal on Image and Video Processing*, 2014:2, January 2014.

André Anjos, Jukka Komulainen, Sébastien Marcel, Abdenour Hadid, and Matti Pietikainen. Face anti-spoofing - visual approach. *Handbook of Biometric Anti-Spoofing*, Chapter 4, 2014.

Ivana Chingovska, André Anjos, and Sébastien Marcel. Evaluation methodologies. *Handbook of Biometric Anti-Spoofing*, Chapter 10, 2014.

André Anjos, Murali Mohan Chakka, and Sébastien Marcel. Motion-based counter-measures to photo attacks in face recognition. *IET Biometrics*, July 2013.

I. Chingovska, J. Yang, Z. Lei, D. Yi, S. Z. Li, O. Kähm, C. Glaser, N. Damer, A. Kuijper, A. Nouak, J. Komulainen, T. Pereira, S. Gupta, S. Khandelwal, S. Bansal, A. Rai, T. Krishna, D. Goyal, M.-A. Waris, H. Zhang, I. Ahmad, S. Kiranyaz, M. Gabbouj, R. Tronci, M. Pili, N. Sirena, F. Roli,

J. Galbally, J. Fierrez, A. Pinto, H. Pedrini, W. S. Schwartz, A. Rocha, A. Anjos, and S. Marcel. The 2nd competition on counter measures to 2d face spoofing attacks. In *International Conference on Biometrics 2013*, 2013.

Ivana Chingovska, André Anjos, and Sébastien Marcel. Anti-spoofing in action: joint operation with a verification system. In *Computer Vision and Pattern Recognition Conference - Biometrics Workshop*, 2013.

Tiago de Freitas Pereira, André Anjos, José Mario De Martino, and Sébastien Marcel. Can face anti-spoofing countermeasures work in a real world scenario? In *International Conference on Biometrics 2013*, 2013.

Jukka Komulainen, Abdenour Hadid, Matti Pietikäinen, André Anjos, and Sébastien Marcel. Complementary countermeasures for detecting scenic face spoofing attacks. In *International Conference on Biometrics 2013*, 2013.

André Anjos, Laurent El Shafey, Roy Wallace, Manuel Günther, Chris McCool, and Sébastien Marcel. Bob: a free signal processing and machine learning toolbox for researchers. In *ACM Multimedia 2012*, pages 1449–1452, 2012.

Ivana Chingovska, André Anjos, and Sébastien Marcel. On the effectiveness of local binary patterns in face anti-spoofing. In *IEEE International Conference of the Biometrics Special Interest Group*, 2012.

Tiago de Freitas Pereira, André Anjos, José Mario De Martino, and Sébastien Marcel. Lbp-top based countermeasure against facial spoofing attacks. In *International Workshop on Computer Vision With Local Binary Pattern Variants - ACCV*, 2012.

André Anjos and Sébastien Marcel. Counter-measures to photo attacks in face recognition: a public database and a baseline. In *International Joint Conference on Biometrics 2011*, 2011. <http://andreanhos.org/publications/2011/08/12/camera-ready-ieee-express-ok.pdf>.

Murali Mohan Chakka, André Anjos, Sébastien Marcel, et al. Competition on counter measures to 2-d facial spoofing attacks. In *International Joint Conference on Biometrics 2011*, 2011. <http://andreanhos.org/publications/2011/08/12/cameraReadyVersion.pdf>.

G.L. Miotto, I. Aleksandrov, A. Amorim, G. Avolio, E. Badescu, M. Caprini, A. Corso-Radu, G.L. Darlea, A. Dos Anjos, I. Fedorko, et al. Configuration and control of the atlas trigger and data acquisition. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 623(1):549–551, 2010.

R C Torres, A dos Anjos, and J M Seixas. Automatizing the online filter test management for a general-purpose particle detector. *Computer Physics Communications*, October 2009. <http://andreanhos.org/publications/2010/11/21/python-tdaq.pdf>.

M Abolins, R Achenbach, C Adorisio, P Adragna, M Aharrouche, A dos Anjos, et al. Atlas trigger status and results from commissioning operations. In *Advanced Computing on High-Energy Physics 2008, Erice, Sicily, Italy*, 2009. <http://andreanhos.org/publications/2009/01/12/ATL-COM-DAQ-2009-004.pdf>.

Teresa Fonseca-Martins et al. Atlas trigger for first physics and beyond. In *Physics at LHC 2008 29 September - October 4, 2008 Split, Croatia*, 2009. <http://andreanhos.org/publications/2009/02/23/ATL-DAQ-PROC-2009-004.pdf>.

A. Di Mattia et al. Commissioning of the atlas high level trigger with single beam and cosmic rays. In *Computing in High Energy and Nuclear Physics, Prague, Czech Republic, 21 - 27 Mar 2009*, 2009. <http://andreanhos.org/publications/2009/06/19/ATL-DAQ-PROC-2009-013-1.pdf>.

Giovanna Lehmann Miotto, Igor Aleksandrov, Antonio Amorim, Giuseppe Avoliod, Elisabeta Badescue, Mihai Caprinie, Alina Corso-Radud, Georgiana L. Darlea, Andre dos Anjos, Ivan Fedorko, Andrei Kazarov, Serguei Kolos, Vladislav Kotov, Andrew J. Lankford, Marius Leahu,

Livio Mapelli, Raul Murillo Garcia, Yuri Ryabov, John E. Sloper, Igor Soloviev, and Lourenco Vaz Gil Lopes. Configuration and control of the atlas trigger and data acquisition. In *The 1st international conference on Technology and Instrumentation in Particle Physics*, 2009. [http://andreanjos.org/publications/2010/01/17/TIPP\\_Article.pdf](http://andreanjos.org/publications/2010/01/17/TIPP_Article.pdf).

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G. Aad, E. Abat, J. Abdallah, A. A. Abdelalim, A. Abdesselam, O. Abdinov, B.A. Abi, M. Abolins, A. Anjos, et al. The atlas experiment at the cern large hadron collider. *Journal of Instrumentation*, 3(S08003), August 2008. [http://andreanjos.org/publications/2008/11/30/Published\\_version\\_jinst8\\_08\\_s08003.pdf](http://andreanjos.org/publications/2008/11/30/Published_version_jinst8_08_s08003.pdf).

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H P Beck et al. Performance of the final event builder for the atlas experiment. *IEEE Transactions on Nuclear Science*, 55(1):176–181, 2008. Also presented at the 15th IEEE Real Time Conference 2007, <http://andreanjos.org/publications/2008/11/30/daq-conf-2007-013.pdf>.

W. Vandelli, M. Abolins, R. Achenbach, C. Adorisio, P. Adragna, M. Aharrouche, A. dos Anjos, et al. Readiness of the atlas trigger and data acquisition system for the first lhcb beams. In *11th Topical Seminar On Innovative Particle And Radiation Detectors, Siena, Italy*, 2008. <http://andreanjos.org/publications/2009/01/19/ATL-COM-DAQ-2009-005.pdf>.

W. Vandelli, M. Abolins, A. Battaglia, HP Beck, R. Blair, AJ Bogaerts, M. Bosman, MD Ciobotaru, R. Cranfield, G. Crone, et al. The atlas event builder. *IEEE Transactions on Nuclear Science*, 55(6):3556–3562, 2008.

Thiago Ciodaro Xavier, André Rabello dos Anjos, and José Manoel de Seixas. Discriminação neural de partículas para um detector submetido a uma alta taxa de eventos. *Learning and Nonlinear Models - Revista da Sociedade Brasileira de Redes Neurais (SBRN)*, 4(2):79–92, October 2007. [http://andreanjos.org/publications/2008/12/02/artigo\\_non\\_linear\\_models.pdf](http://andreanjos.org/publications/2008/12/02/artigo_non_linear_models.pdf).

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Andre dos Anjos, Paul Bell, David Berge, Johannes Haller, Simon Head, Shumin Li, Andreas Hoecker, Takanori Kohno, Tania McMahon, Miroslav Nozicka, Hans von der Schmitt, Ralf Spiwoks, Joerg Stelzer, Thorsten Wengler, and Werner Wiedenmann. The configuration system of the atlas trigger. In *IEEE Real-time conference*, 2007. <http://andreanjos.org/publications/2008/02/20/AtlasTriggerConfiguration.pdf>.

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I. Riu, M. Abolins, P. Adragna, G. Avolio, A. Anjos, et al. Integration of the trigger and data acquisition systems in atlas. In *IEEE Real-time conference*, 2007. <http://andreanhos.org/publications/2008/02/20/com-daq-2007-018-1-may-RT07.pdf>.

Rodrigo Coura Torres, José Manoel Seixas, André Rabello dos Anjos, and Danilo Vannier Cunha. Online electron/jet neural high-level trigger over independent calorimetry information. In *XI International Workshop on Advanced Computing and Analysis Techniques in Physics Research*, 2007. <http://andreanhos.org/publications/2007/08/01/acat-2007.pdf>.

W. Vandelli, M. Abolins, A. Battaglia, H.P. Beck, R. Blair, A. Bogaerts, M. Bosman, M. Ciobotaru, R. Cranfield, G. Crone, J. Dawson, R. Dobinson, M. Dobson, A. dos Anjos, et al. The atlas event builder. In *IEEE Nuclear Science Symposium and Medical Imaging Conference*, 2007. <http://andreanhos.org/publications/2008/02/20/EB-IEEE.pdf>.

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A. dos Anjos, S. Armstrong, J. T. M. Baines, H. P. Beck, C. P. Bee, et al. Deployment of the atlas high-level trigger. *IEEE Transactions on Nuclear Science*, 53:2144–2149, August 2006. <http://andreanhos.org/publications/2008/11/30/cer-002693978.pdf>.

A. dos Anjos, R.C. Torres, J.M. Seixas, B.C. Ferreira, and T.C. Xavier. Neural triggering system operating on high resolution calorimetry information. *Nuclear Instruments and Methods in Physics Research*, 559(1):134–138, April 2006. <http://andreanhos.org/publications/2008/11/30/acat2005-paper.pdf>.

A dos Anjos, Nick Ellis, J Haller, A Höcker, T Kohn, M Landon, H von der Schmitt, R Spiwoks, T Wengler, W Wiedenmann, and H Zobernig. A configuration system for the atlas trigger. *Journal of Instrumentation, Institute of Physics Publishing and Sissa*, February 2006. [http://andreanhos.org/publications/2008/11/30/jinst6\\_05\\_p05004.pdf](http://andreanhos.org/publications/2008/11/30/jinst6_05_p05004.pdf).

André Anjos. *Sistema Online de Filtragem em um Ambiente com Alta Taxa de Eventos*. PhD thesis, COPPE/UFRJ, 2006. <http://andreanhos.org/publications/2007/03/26/phd-thesis.tar.bz2>.

Doris Burckhart-Chromek, M Abolins, P Adragna, M Albuquerque-Portes, L Alexandrov, A Amorim, A Anjos, et al. Testing on a large scale: running the atlas data acquisition and high level trigger software on 700 pc nodes. In *Computing In High Energy and Nuclear Physics*, 2006. <http://andreanhos.org/publications/2008/11/30/daq-conf-2006-002.doc>.

K Kordas, S Armstrong, J T M Baines, H P Beck, C Bee, A Bogaerts, and A; dos Anjos. Atlas high level trigger infrastructure, roi collection and event building. In *15th International Conference on Computing In High Energy and Nuclear Physics*, 2006. <http://andreanhos.org/publications/2008/11/30/daq-conf-2007-002.pdf>.

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