



André Anjos

Signal Processing Engineer, D.Sc.

Social Information

Date of Birth: December 31, 1973 (44 years old)
Nationality: Swiss and Brazilian
Family: Married, One child

Professional Experience

2018 **Permanent Researcher**, Idiap Research Institute, Martigny, Switzerland.

Head of the Biosignal Processing Group.

Teaching:

- Fundamentals in statistical pattern recognition, post-graduate level, at the École Polytechnique Fédérale de Lausanne (EPLF, Switzerland), EE-612

Supervision:

- Supervision of Jaden Diefenbaugh, graduate student on work associated with the [BEAT platform](#)

Interests:

- Biomedical-related signal processing applications
- Analysis of biomedical records and e-Health
- Diagnostics for medical-related applications
- Image and signal processing
- Pattern recognition and machine learning
- Open-science

2014–2018 **Research Associate**, 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 (EPLF, 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; Technical lead at Idiap;
- IARPA Project Odin (BATL team): presentation attack detection for face recognition using Visual, NIR and Thermal cameras. Technical contact point;
- Development and management of [Bob](#), a framework for reproducible research in pattern recognition and machine learning.

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- 2010–2013 **Post-doctoral Researcher**, 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 (EPLF, Switzerland), EE-612
- Supervision:**
- Co-supervision of Ivana Chingovska, doctorate student;
 - Co-supervision of Tiago Freitas Pereira and Jukka Mäatta, visiting students;
 - Co-supervision of Murali Mohan Chakka, trainee.
- Project writing and involvement:**
- FP7 BEAT: contact point for Idiap, leader on 2 work packages. BEAT develops a new online platform for biometric system certification and development;
 - FP7 TABULA RASA: contact point for Idiap. TABULA RASA investigates sensitiveness to spoofing attacks on biometric systems;
 - CTI Project Replay: development of database and counter-measures to spoofing. Construction of working prototypes with the industrial partner (KeyLemon);
 - 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:
- Supervision of CERN summer students (three summers);
 - Co-supervision Rodrigo Coura Torres, doctorate student.
- Achievements:**
- 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 intership at CERN, Switzerland).
 Signal Processing student.
Achievements:
- Sub-optimal filtering for particle discrimination;
 - Neural classifiers implemented in a transputer-based parallel machine;
 - 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 become the final design of the trigger for the ATLAS experiment.

Scientific Contributions

Open Software

- 2010– **Bob**, <https://www.idiap.ch/software/bob>, A framework for reproducible research in pattern recognition and machine learning.
- 2012– **BEAT**, <https://www.beat-eu.org/platform>, A platform for open-science in machine learning and pattern recognition.



Open Data

- 2016 **COHFACE**, <https://www.idiap.ch/dataset/cohface>, An open-dataset for studying remote photo-plethysmography.
- 2011 **Replay-Attack**, <https://www.idiap.ch/dataset/replayattack>, A video dataset for studying presentation-attack detection in Biometrics.

Committees

- 2018 **17th International Conference of the Biometrics Special Interest Group**, *Program Committee*.
- 2016 **IAPR International Conference on Biometrics**, *Program Committee*.
- 2015 **IEEE International Conference on Biometrics: Theory, Applications, and Systems**, *Participation on Doctoral Consortium*.

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- 2015 **IEEE International Conference on Biometrics: Theory, Applications, and Systems**, *Chair of special session on "Reproducible Research in Biometrics"*.
- 2015 **IAPR International Conference on Biometrics**, *Program Committee*.
- 2014 **International Workshop on Soft-biometrics**, *Program Committee*, Hosted by ECCV.
[Reviewer](#)
- 2014– **Elsevier Image and Vision Computing (IMAVIS)**.
- 2013– **IEEE Transactions on Information Forensics and Security**.
- 2013– **IET Biometrics**.
- 2012– **IEEE Transactions in Image Processing**.
- 2012– **IEEE Transactions on Circuits and Systems for Video Technology**.

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.

Patents

- WO2017221049 A data-network connected server, a device, a platform and a method for conducting computer-executable experiments (published), cf. *EU FP7 BEAT Project*.
- US20150970333 Method and internet-connected server for reviewing a computer-executable experiment (published), 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, and documenting
- Databases Extensive experience with the use and development of databases

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.

Off-work

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Sports Alpine skiing, Biking, Tennis, Swimming
Music Various percussion instruments and brazilian cavaquinho
Computing Explore new techniques and tools

Quick remarks on publications

H-Index = 21. 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. All articles are available in PDF format at my [professional website](#).
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 169 citations (published on October 2011). It is my 4th most cited work.
Ph.D. The fourteenth most cited article (44 citations) corresponds to my Ph.D. thesis journal article.

Publications (reverse chronological order)

- [1] Olegs Nikisins, Teodors Eglitis, André Anjos, and Sébastien Marcel. "Fast cross-correlation based wrist vein recognition algorithm with rotation and translation compensation". In: *Sixth International Workshop on Biometrics and Forensics*. June 2018. URL: <https://publications.idiap.ch/index.php/publications/show/3835>.
- [2] Olegs Nikisins, Amir Mohammadi, André Anjos, and Sébastien Marcel. "On Effectiveness of Anomaly Detection Approaches against Unseen Presentation Attacks in Face Anti-Spoofing". In: *The 11th IAPR International Conference on Biometrics (ICB 2018)*. Feb. 2018. URL: <https://publications.idiap.ch/index.php/publications/show/3793>.
- [3] Guillaume Heusch, André Anjos, and Sébastien Marcel. *A reproducible study on remote heart rate measurement*. Sept. 2017. arXiv: 1709.00962 [cs-se]. URL: <https://arxiv.org/abs/1709.00962>.
- [4] André Anjos, Manuel Günther, Tiago de Freitas Pereira, Pavel Korshunov, Amir Mohammadi, and Sébastien Marcel. "Continuously Reproducing Toolchains in Pattern Recognition and Machine Learning Experiments". In: *Thirty-fourth International Conference on Machine Learning*. Sidney, Australia, Aug. 2017. URL: <https://publications.idiap.ch/index.php/publications/show/3666>.
- [5] André Anjos, Laurent El Shafey, and Sébastien Marcel. "BEAT: An Open-Science Web Platform". In: *Thirty-fourth International Conference on Machine Learning*. Sydney, Australia, Aug. 2017. URL: <https://publications.idiap.ch/index.php/publications/show/3665>.
- [6] Milos Cernak, Alain Komaty, Amir Mohammadi, André Anjos, and Sébastien Marcel. "Bob Speaks Kaldi". In: *Proceedings of Interspeech*. Aug. 2017. URL: <https://publications.idiap.ch/index.php/publications/show/3623>.
- [7] André Anjos, Laurent El-Shafey, and Sébastien Marcel. *BEAT: An Open-Source Web-Based Open-Science Platform*. Apr. 2017. arXiv: 1704.02319 [cs-se]. URL: <https://arxiv.org/abs/1704.02319>.
- [8] Ivana Chingovska, Nesli Erdogmus, André Anjos, and Sébastien Marcel. "Face Recognition Systems Under Spoofing Attacks". In: *Face Recognition Systems Under Spoofing Attacks*. 1st edition. Springer International Publishing, Feb. 2016. Chap. 8, pp. 165–194. DOI: 10.1007/978-3-319-28501-6_8.
- [9] Aythami Morales, Julian Fierrez, Ruben Tolosana, Javier Ortega-Garcia, Javier Galbally, Marta Gomez-Barrero, André Anjos, and Sébastien Marcel. "Keystroke Biometrics Ongoing Competition". In: *IEEE Access* 4 (Nov. 2016), pp. 7736–7746. ISSN: 2169-3536. DOI: 10.1109/ACCESS.2016.2626718.
- [10] Ivana Chingovska and André Anjos. "On the use of client identity information for face anti-spoofing". In: *IEEE Transactions on Information Forensics and Security, Special Issue on Biometric Anti-spoofing* 10.4 (Feb. 2015), pp. 787–796. DOI: 10.1109/TIFS.2015.2400392.
- [11] Ivana Chingovska, André Anjos, and Sébastien Marcel. "Anti-spoofing: Evaluation Methodologies". In: *Encyclopedia of Biometrics*. Ed. by Stan Z.Li and Anil Jain. 2nd edition. Springer US, 2014. ISBN: 978-3-642-27733-7. DOI: 10.1007/978-3-642-27733-7.

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- [12] André Anjos, Ivana Chingovska, and Sébastien Marcel. "Anti-Spoofing: Face Databases". In: *Encyclopedia of Biometrics*. Ed. by Stan Z.Li and Anil Jain. 2nd edition. Springer US, 2014. ISBN: 978-3-642-27733-7. DOI: 10.1007/978-3-642-27733-7_9212-2.
- [13] Ivana Chingovska, André Anjos, and Sébastien Marcel. "Biometrics Evaluation Under Spoofing Attacks". In: *IEEE Transactions on Information, Forensics and Security* 9.12 (Aug. 2014). DOI: 10.1109/TIFS.2014.2349158.
- [14] André Anjos, Jukka Komulainen, Sébastien Marcel, Abdenour Hadid, and Matti Pietikainen. "Face Anti-Spoofing: Visual Approach". In: *Handbook of Biometric Anti-Spoofing*. Ed. by Sébastien Marcel, Mark Nixon, and Stan Z.Li. Springer-Verlag, 2014. Chap. 4, pp. 65–82. DOI: 10.1007/978-1-4471-6524-8_4.
- [15] Ivana Chingovska, André Anjos, and Sébastien Marcel. "Evaluation Methodologies". In: *Handbook of Biometric Anti-Spoofing*. Ed. by Sébastien Marcel, Mark Nixon, and Stan Z.Li. Springer-Verlag, 2014. Chap. 10, pp. 185–204. DOI: 10.1007/978-1-4471-6524-8_10.
- [16] Stan Z.Li, Javier Galbally, André Anjos, and Sébastien Marcel. "Evaluation Databases". In: *Handbook of Biometric Anti-Spoofing*. Ed. by Sébastien Marcel, Mark Nixon, and Stan Z.Li. Springer-Verlag, 2014. Chap. Appendix A, pp. 247–278. ISBN: 978-1-4471-6523-1. DOI: 10.1007/978-1-4471-6524-8.
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- [18] André Anjos, Murali Mohan Chakka, and Sébastien Marcel. "Motion-Based Counter-Measures to Photo Attacks in Face Recognition". In: *IET Biometrics* (July 2013). DOI: 10.1049/iet-bmt.2012.0071.
- [19] 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*. June 2013. DOI: 10.1109/CVPRW.2013.22.
- [20] 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*. June 2013. DOI: 10.1109/ICB.2013.6612981.
- [21] 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*. June 2013. DOI: 10.1109/ICB.2013.6612968.
- [22] 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*. June 2013. DOI: 10.1109/ICB.2013.6613026.
- [23] 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*. 2012. DOI: 10.1007/978-3-642-37410-4_11.
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- [25] 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. ISBN: 978-3-88579-290-1.
- [26] 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*. Oct. 2011. DOI: 10.1109/IJCB.2011.6117503.
- [27] 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*. Oct. 2011. DOI: 10.1109/IJCB.2011.6117509.

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- [30] The ATLAS Collaboration. "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.
- [31] The ATLAS Collaboration. "The ATLAS online High Level Trigger framework: experience reusing offline software components in the ATLAS trigger". In: *Computing in High Energy and Nuclear Physics, Prague, Czech Republic, 21 - 27 Mar 2009*. 2009.
- [32] The ATLAS Collaboration. "Configuration and Control of the ATLAS Trigger and Data Acquisition". In: *The 1st international conference on Technology and Instrumentation in Particle Physics*. 2009.
- [33] The ATLAS Collaboration. "Atlas trigger for first physics and beyond". In: *Physics at LHC 2008 29 September - October 4, 2008 Split, Croatia*. 2009.
- [34] The ATLAS Collaboration. "ATLAS Trigger Status and Results From Commissioning Operations". In: *Advanced Computing on High-Energy Physics 2008, Erice, Sicily, Italy*. 2009.
- [35] André Anjos. "Trigger Systems". In: *Experimental High-Energy Physics and Associated Technologies Workshop*. 2008.
- [36] André Anjos on behalf of the ATLAS Collaboration. "The DAQ/HLT system of the ATLAS experiment". In: *International Workshop on Advanced Computing and Analysis Techniques in Physics Research*. 2008.
- [37] The ATLAS Collaboration. "Readiness of the ATLAS Trigger and Data Acquisition system for the first LHC beams". In: *11th Topical Seminar On Innovative Particle And Radiation Detectors, Siena, Italy*. 2008.
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- [39] The ATLAS Collaboration. "The ATLAS Experiment at the CERN Large Hadron Collider". In: *Journal of Instrumentation* S08003 (Aug. 2008).
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- [42] The ATLAS Collaboration. "Alignment data streams for the ATLAS Inner Detector". In: *Computing for High-Energy Physics*. 2007.
- [43] Thiago Ciodaro Xavier, André Rabello Anjos, and José Manoel de Seixas. "Discriminação Neural de Partículas para um Detector Submetido a uma Alta Taxa de Eventos". In: *Learning and Nonlinear Models - Revista da Sociedade Brasileira de Redes Neurais (SBRN) 4.2* (Oct. 2007), pp. 79-92.
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- [45] 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.
- [46] The ATLAS Collaboration. "Integration of the Trigger and Data Acquisition systems in ATLAS". In: *IEEE Real-time conference*. 2007.
- [47] André Anjos on behalf of the ATLAS Collaboration. "The Configuration System of the ATLAS Trigger". In: *IEEE Real-time conference*. 2007.
- [48] The ATLAS Collaboration. "Performance of the final Event Builder for the ATLAS Experiment". In: *15th IEEE Real Time Conference 2007*. 2007.
- [49] André Anjos. "Sistema Online de Filtragem em um Ambiente com Alta Taxa de Eventos". PhD thesis. COPPE/UFRJ, 2006.

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- [51] André Anjos on behalf of the ATLAS Collaboration. "Deployment of the ATLAS High-Level Trigger". In: *IEEE Transactions on Nuclear Science* 53 (Aug. 2006), pp. 2144–2149.
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- [53] The ATLAS Collaboration. "Studies with the ATLAS Trigger and Data Acquisition Pre-Series Setup". In: *15th International Conference on Computing In High Energy and Nuclear Physics*. 2006.
- [54] The ATLAS Collaboration. "ATLAS High Level Trigger Infrastructure, ROI Collection and Event Building". In: *15th International Conference on Computing In High Energy and Nuclear Physics*. 2006.
- [55] André Anjos on behalf of the ATLAS Collaboration. "A configuration system for the ATLAS trigger". In: *Journal of Instrumentation, Institute of Physics Publishing and Sissa P05004* (Feb. 2006).
- [56] The ATLAS Collaboration. "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.
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- [60] A. Anjos, R.C. Torres, B.C. Ferreira, T.C. Xavier, and J.M. de Seixas. "Discriminação Neural de Elétrons no Segundo Nível de Trigger do ATLAS". In: *XXVI Encontro Nacional de Física de Partículas e Campos*. Oct. 2005.
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- [68] The ATLAS Collaboration. "Performance of the ATLAS DAQ DataFlow system". In: *Computing in High Energy Physics and Nuclear Physics*. Oct. 2004.
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- [70] A. Anjos and J.M. Seixas. "Os Filtros de Alto Nível do Experimento ATLAS". In: *XXVI Encontro Nacional de Física de Partículas e Campos*. Aug. 2004.

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