Cristina Lois Gómez

Massachusetts Institute of Technology Research Laboratory of Electronics, Room 36-705 77 Massachusetts Ave. Cambridge, MA 02139-4307

Academic positions

Harvard Medical School & Massachusetts General Hospital

Boston, MA

Research Fellow in Radiology

Jul. 2015-present

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web: bit.ly/crislois

- Applied PET/MR imaging to search for markers of disease and progression in Huntington's Disease. This is being used in a clinical trial to test new treatments.
- Worked on multi-modal human neuroimaging to explore and develop new concepts in healthy and diseased brain function.

Massachusetts Institute of Technology

Cambridge, MA

"M+Vision" Research Fellow

Jul. 2012-June 2015

- Intensive training on identifying unmet clinical needs and design solutions with high translational potential and marketability.
- Investigated the biological basis of the placebo effect in depression using PET/MR imaging.
- Worked on the development of a new PET tracer for early assessment of treatment response in melanoma patients. Received a \$283K grant as co-PI to develop this project.

Hospital Clinic Barcelona

Barcelona, Spain

Visiting Researcher

Jan. 2012- Jun. 2012

Evaluated dual-time point PET for prediction of treatment response in lung cancer patients.

Imaging Science Institute

Tübingen, Germany

Visiting Researcher

Feb. 2011- Jul. 2011

Analyzed the effect of MRI contrast agents on PET quantification for PET/MRI applications, and demonstrated how to avoid potential artifacts that could impact clinical decisions.

Hospital Clinic Barcelona

Barcelona, Spain

Visiting Researcher

3 months in 2009 and 2010

Compared the performance of GATE & PeneloPET in simulating a microPET scanner.

University of Santiago de Compostela

Santiago de Compostela, Spain

"Ángeles Alvariño" Fellow

Dec. 2008-Dec 2011

Designed and built an affordable preclinical SPECT system by reusing a clinical gamma-camera. Recipient of a 60K €grant as PI to carry out the project. Supervised a graduate student and a postdoc.

University of Tennessee Medical Center

Knoxville, TN

Postdoctoral Research Associate

Feb. 2007- Jul. 2008

Demonstrated the benefits of incorporating time-of-flight information in PET/CT by carrying out a study on a large population of 100 oncology patients. Published two highly cited papers, one chosen as cover in *Journal of Nuclear Medicine*.

University of Santiago de Compostela

Santiago de Compostela, Spain Sep. 2006–Jan 2007

Postdoctoral Research Assistant

Measured the neutron fluency in a linear accelerator to estimate its contribution to the radiation dose in radiotherapy patients.

University of Zürich

Zürich, Switzerland

&

University of Santiago de Compostela

Santiago de Compostela, Spain Sep. 2002–Jun. 2006

Research & Teaching Assistant

Contributed to the design and development, and carried out performance studies of the silicon microstrip detectors installed in the Silicon Tracker of the LHCb experiment at CERN.

Awards

M+Vision Fellowship

Madrid-MIT M+Vision Consortium

Jul. 2012

Ranked 2nd among more than 100 applicants.

"Best Oral Presentation in Nuclear Medicine"

Spanish Nuclear Society Annual Meeting

Oct. 2010

Front cover of the Journal of Nuclear Medicine, Vol. 50

Aug. 2009

Featuring results on "Impact of Time-of-Flight on PET Tumor Detection".

José Castillejo Fellowship

Ministerio de Educación y Ciencia, Spain

Sep. 2007–Jun. 2008

Ángeles Alvariño Fellowship

Xunta de Galicia, Spain

Dec. 2008-Dec. 2011

Ranked 2nd among more than 200 applicants.

Predoctoral research grant

Universidad de Santiago de Compostela, Spain Excma. Diputación Provincial de A Coruña, Spain Excma. Diputación Provincial de A Coruña, Spain Oct. 2005-May 2006 Jul. 2003-Jul. 2004

Jul. 2002–Jul. 2003

Grants

Treatment response in advanced melanoma patients

Funding Agency: Madrid-MIT M+Vision Consortium.

Duration: Feb. 2013-Dec. 2014.

Budget: \$283380.

Principal Investigators: Osasere Evboumwan and Cristina Lois.

Development of a pinhole SPECT system based on a conventional gamma camera

Funding Agency: Xunta de Galicia, Spain.

Duration: Dec. 2009–Dec. 2011.

Budget: $60000 \in$.

Principal Investigator: Cristina Lois.

Development and evaluation of the next generation of high-performance PET Scanners

Funding Agency: Programa José Castillejo, Ministerio de Educación y Ciencia.

Duration: Jul. 2007-Jun. 2008.

Budget: 25000 €.

Principal Investigator: Cristina Lois.

Education

PhD in Physics, with European Doctorate University of Santiago de Compostela

MSc in Particle Physics & Non-linear Dynamics University of Santiago de Compostela

BSc in Physics
University of Santiago de Compostela

Oct. 2001 - May 2006 Santiago de Compostela, Spain

Oct. 2001 - Sep. 2003 Santiago de Compostela, Spain

Oct. 1995 - Sept. 2001 Santiago de Compostela, Spain

Publications

See also my Google Scholar profile at bit.ly/cloispubs.

- C. Lois, P. Aguiar, B. Couce, A. Iglesias, Characterization of low energy Lu background on continuous LYSO blocks in Nuclear Science Symposium Conference Record (NSS/MIC), 2010 IEEE, IEEE, pp. 1–3.
- B. Couce, C. Lois, F. Gómez, A. Iglesias, P. Aguiar, Parametrization of SiPM dynamic range contribution to energy resolution of scintillation light readout in Nuclear Science Symposium Conference Record, 2008. NSS'08. IEEE, IEEE, pp. 3973–3974.
- P. Aguiar, C. Lois, B. Couce, A. Iglesias, Monte Carlo optimization of SiPM readout configurations for continuous LYSO blocks in Nuclear Science Symposium Conference Record (NSS/MIC), 2010 IEEE, IEEE, pp. 3638–3640.
- D. J. Kadrmas, M. E. Casey, M. Conti, B. W. Jakoby, C. Lois, D. W. Townsend. Impact of time-of-flight on PET tumor detection. *Journal of Nuclear Medicine* 2009, 50, 1315–1323.
- C. Lois, B. W. Jakoby, M. J. Long, K. F. Hubner, D. W. Barker, M. E. Casey, M. Conti, V. Y. Panin, D. J. Kadrmas, D. W. Townsend. An assessment of the impact of incorporating time-of-flight information into clinical PET/CT imaging. *Journal of Nuclear Medicine* 2010, 51, 237–245.
- F. Popota, P. Aguiar, Y. Fernandez, C. Lois, D. Pareto, D. Ros, J. Pavia, J. Gispert, Comparison of NEMA NU 4-2008 vs NEMA NU 2-2001 for the performance evaluation of the microPET R4 system in Nuclear Science Symposium Conference Record (NSS/MIC), 2009 IEEE, IEEE, pp. 2706–2709.
- P. Aguiar, C. Lois, F. Gomez, A. Iglesias, Design simulations of a LSO crystal block detector module for dual PET/SPECT systems in Nuclear Science Symposium Conference Record, 2008. NSS'08. IEEE, IEEE, pp. 3829–3831.
- C. Lois, B. W. Jakoby, K. Hubner, M. Cañadas, D. W. Townsend, Physical and Clinical Evaluation of Standardized Uptake Values in APS Meeting Abstracts, p. 16004.

- M. Agari, R. Bernhard, A. Vollhardt, M. Schmelling, H. Voss, O. Steinkamp, F. Lehner, M. Needham, B. Schwingenheuer, C. Lois, et al., *Test-beam measurements on prototype ladders for the LHCb TT station and Inner Tracker*, Tech. Rep., CERN-LHCb-2003-082, **2004**.
- J. Gassner, C. Lois, F. Lehner, S. Heule, Capacitance measurements on silicon micro-strip detectors for the TT station of the LHCb experiment, Tech. Rep., CERN-LHCb-2003-081, 2003.
- C. Lois. Silicon sensor probing and radiation studies for the LHCb silicon tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2006, 568, 277–283.
- G. Baumann, A. Büchler, T. Mattle, C. Lois, D. Boeni, L. Buchmann, F. Lehner, N. Chiapolini, N. Franz, S. Nüesch, et al., *Quality Assurance of 100 CMS2-OB2 Sensors*, Tech. Rep., **2005**.
- F. Lehner, C. Lois, H. Voss. Measurements on irradiated silicon sensor prototypes for the Inner Tracker of LHCb. *CERN-LHCb-2004-104* **2004**.
- C. Lois, R. Bernhard, M. Needham, A. Vollhardt, A. Wenger. Laboratory Measurements on Irradiated Prototype Ladders for the LHCb Inner Tracker. *CERN-LHCb-2004-112* **2004**.
- A. Vollhardt, D. Volyanskyy, M. Schmelling, P. Fauland, B. Carron, J. Van Hunen, H. Voss, P. Vazquez, A. Bay, S. Köstner, et al., Production of the LHCb silicon tracker readout electronics, Tech. Rep., CERN, 2005.
- B. Adeva, M. Agari, C. Bauer, D. Baumeister, A. Bay, R. Bernhard, R. Bernet, J. Blouw, B. Carron, Y. Ermoline, et al.. The LHCb silicon tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2005, 546, 76–80.
- M. Agari, A. Vollhardt, M. Schmelling, W. Hofmann, H. Voss, R. Bernhard, O. Steinkamp, F. Lehner, M. Needham, B. Schwingenheuer, et al., Studies of the Beetle 1.2 Pipeline Homogeneity, Tech. Rep., CERN-LHCb-2003-155, 2003.
- R. Bernhard, C. Lois, S. Heule, M. Needham, A. Vollhardt, D. Volyanskyy. Measurements of prototype ladders for the silicon tracker with a laser. *LHCb note in Vorbereitung* **2003**.
- G. Baumann, A. Büchler, T. Mattle, D. Boeni, L. Buchmann, F. Lehner, N. Chiapolini, C. Lois, S. Nüesch, E. Eisenring, et al., *Pre-series sensor qualification for the inner tracker of LHCb*, Tech. Rep., **2005**.
- A. Bay, O. Steinkamp, J. Van Hunen, N. Smale, M. Needham, S. Köstner, K. Vervink, M. Tran, C. Lois, D. Volyanskyy, et al., Hybrid design, procurement and testing for the LHCb Silicon Tracker, Tech. Rep., CERN, 2005.
- D. Volyanskyy, E. Pérez-Trigo, J. Van Tilburg, O. Steinkamp, V. Yakovenko, M. Needham, O. Schneider, S. Köstner, K. Vervink, L. Nicolas, et al., Production and quality assurance of detector modules for the LHCb silicon tracker, Tech. Rep., 2007.
- M. Agari, B. Carron, O. Steinkamp, J. Van Hunen, M. Needham, S. Köstner, K. Vervink, A. Bay, C. Lois, D. Volyanskyy, et al., A radiation tolerant fiber-optic readout system for the LHCb Silicon Tracker, Tech. Rep., 2005.
- S. Koestner, B. Adeva, M. Agari, C. Bauer, D. Baumeister, A. Bay, R. Bernhard, R. Bernet, J. Blouw, B. Carron, et al., *The Silicon Tracker of the LHCb Experiment, Vol. 26*, contribution, **2004**.

- M. Agari, M. Bauer, T. Blake, J. Blouw, D. Esperante-Pereira, J. Gassner, S. Köstner, C. Lois, M. Needham, A. Perrin, et al.. Measurements of a prototype ladder for the TT station in a 120° GeV/c π^- beam. **2005**.
- B. Adeva, B. Carron, O. Steinkamp, F. Lehner, Y. Ermoline, S. Köstner, O. Schneider, A. Bay, M. Tran, C. Lois, et al., Performance studies of the silicon strip detectors of the LHCb Silicon Tracker, Tech. Rep., 2005.
- O. Steinkamp, et al.. Design and production of detector modules for the LHCb Silicon Tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2007, 579, 736–741.
- M. Agari, B. Carron, E. Pérez-Trigo, O. Steinkamp, J. Van Hunen, N. Smale, M. Needham, O. Schneider, S. Köstner, K. Vervink, et al., *Performance of long ladders for the LHCb Silicon Tracker*, Tech. Rep., **2005**.
- M. Agari, E. Pérez-Trigo, O. Steinkamp, M. Needham, S. Köstner, W. Hofmann, K. Vervink, L. Nicolas, O. Schneider, A. Bay, et al., *Radiation monitoring system for the LHCb Inner Tracker*, Tech. Rep., **2007**.
- A. Bay, D. Esperante, S. Löchner, C. Lois, F. Lehner, C. Bauer, Y. Ermoline, S. Jimenez-Otero, S. Köstner, D. Baumeister, et al.. The LHCb silicon tracker. Nuclear instruments & methods in physics research. Section A, Accelerators, spectrometers, detectors and associated equipment 2005, 546, 76–80.
- F. Lehner, M. Siegler, C. Lois, M. Pangilinan, Mechanical and Thermal Characterisation of a TT Half-Module Prototype, Tech. Rep., 2005.
- B. Adeva, M. Agari, C. Bauer, D. Baumeister, A. Bay, R. Bernhard, R. Bernet, J. Blouw, B. Carron, Y. Ermoline, et al., The silicon tracker of the LHCb experiment in Nuclear Science Symposium Conference Record, 2004 IEEE, IEEE, pp. 1179–1182.
- S. Kostner, B. Adeva, M. Agari, C. Bauer, D. Baumeister, A. Bay, R. Bernhard, R. Bernet, J. Blouw, B. Carron, et al.. LHCb silicon tracker performance studies. *Nuclear Science*, *IEEE Transactions on* 2006, 53, 2440–2445.
- C. L. Gomez, U. de Santiago de Compostela. Facultade de Física, U. de Santiago de Compostela. Departamento de Física de Partículas, Signal and Noise Performance of a Prototype Silicon Microstrip Detector for the LHCb Silicon Tracker., 2004.
- R. Antunes Nobrega, A. Franca Barbosa, I. Bediaga, G. Cernicchiaro, E. Correade Oliveira, J. Magnin, J. Marquesde Miranda, A. Massafferri, E. Polycarpo, A. Reis, et al.. LHCb reoptimized detector design and performance: Technical Design Report. 2003.
- R. A. Nobrega, A. F. Barbosa, I. Bediaga, G. Cernicchiaro, E. C. Oliveira, J. Magnin, J. M. Miranda, A. Massafferri, E. Polycarpo, A. Reis, et al.. LHCb Trigger System: Technical Design Report. 2003.
- R. A. Nobrega, A. F. Barbosa, I. Bediaga, G. Cernicchiaro, E. C. De Oliveira, J. Magnin, L. M. De Andrade Filho, J. M. De Miranda, H. P. L. Junior, A. Reis, et al.. LHCb computing technical design report. 2005.
- C. Lois-Gómez, P. (Dir: Adeva-Andany, B & Vázquez-Regueiro, Study of Silicon Microstrip Detector Properties for the LHCb Silicon Tracker, Ph.D. thesis, CERN-THESIS; University of Santiago de Compostela, 2006.

- A. Barbosa, I. Bediaga, G. Cernicchiaro, G. Guerrer, A. Machado, J. Magnin, F. Marujo, J. d. Miranda, A. Reis, A. Santos, et al.. The LHCb Detector at the LHC. *Journal of Instrumentation* **2008**, *3*, S08005.
- Status and expected performance of the LHCb tracking system. *Nuclear Physics B-Proceedings Supplements* **2006**, *156*, 217–220.
- M. Agari, C. Bauer, D. Baumeister, J. Blouw, W. Hofmann, K. Knopfle, S. Lochner, M. Schmelling, V. Pugatch, A. Bay, et al.. The lhcb silicon tracker project. *Nuclear Physics B-Proceedings Supplements* 2006, 150, 114–117.
- O. Steinkamp. Silicon strip detectors for the LHCb experiment. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2005, 541, 83–88.
- O. Steinkamp. Performance of long ladders for the LHCb silicon tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2006, 569, 84–87.
- M. C.-C. L. B. J. M. L. C. H. C. W. M. Conti, D. Townsend, B. Bendriem. Assessment of the clinical potential of a time-of-flight PET/CT scanner with less than 600 ps timing resolution. *Journal of Nuclear Medicine* **2008**, *49*, 411P.
- L. collaboration, et al., The re-optimized LHCb Detector Design and Performance, Tech. Rep., CERN/LHCC/2003-030, 2003.
- K. Vervink. Design and performance of the LHCb Silicon Tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2006, 566, 170–173.
- H. Voss. The LHCb silicon tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2005, 549, 44–48.
- R. Bernhard, et al.. The LHCb silicon tracker. Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 2008, 596, 17–20.
- P. Aguiar, A. Iglesias, B. Couce, C. Lois. A feasibility study on the use of arrays of discrete SiPMs for MR compatible LYSO readout using Monte Carlo simulation. *Journal of Instrumentation* **2012**, 7, P06002.
- C. Lois, I. Bezrukov, H. Schmidt, N. Schwenzer, M. K. Werner, J. Kupferschläger, T. Beyer. Effect of MR contrast agents on quantitative accuracy of PET in combined whole-body PET/MR imaging. European Journal of Nuclear Medicine and Molecular Imaging 2012, 39, 1756–1766.
- P. Aguiar, C. Lois. Analytical study of the effect of the system geometry on photon sensitivity and depth of interaction of positron emission mammography. *Journal of Oncology* **2012**, *2012*.
- M. Werner, J. Wiegand, J. Kupferschläger, C. Lois, I. Bezrukov, H. Schmidt, T. Beyer, C. Pfannenberg, N. Schwenzer. Auswirkungen von Zahnimplantaten auf die Bildqualität in PET/CT und PET/MR. RöFo-Fortschritte auf dem Gebiet der Röntgenstrahlen und der bildgebenden Verfahren, 184, VO209-4.
- S. Cadeddu, P. Dalpiaz, Z. Guzik, Y. Vasiliev, S. Köstner, E. Spiridenkov, F. Wilson, A. Khan, P. Perret, O. Schneider, et al., *LHCb trigger system*, Tech. Rep., LHCb-TDR-010, **2003**.

- S. Cadeddu, P. Dalpiaz, Z. Guzik, Y. Vasiliev, S. Köstner, E. Spiridenkov, F. Wilson, A. Khan, P. Perret, O. Schneider, et al., *LHCb reoptimized detector design and performance*, Tech. Rep., LHCb-TDR-009, 2003.
- S. Cadeddu, P. Dalpiaz, S. Stoica, Z. Guzik, Y. Filipchenko, S. Köstner, E. Spiridenkov, F. Metlica, M. Barnyakov, A. Smith, et al., *LHCb computing*, Tech. Rep., LHCb-TDR-011, 2005.
- C. Lois, J. Kupferschläger, I. Bezrukov, H. Schmidt, M. Werner, J. Mannheim, B. Pichler, N. Schwenzer, T. Beyer, Effect of MR contrast agents on quantitative accuracy of PET in combined whole-body PET/MR imaging in Annual Congress of the European Association of Nuclear Medicine (EANM 2011).
- G. Wagenknecht, E. R. Kops, F. Mantlik, E. Fried, T. Pilz, H. Hautzel, L. Tellmann, B. Pichler, H. Herzog, C. Lois, et al., Attenuation Correction in MR-BrainPET with Segmented T1-Weighted MR Images of the Patients Head-A Comparative Study with CT in 2011 IEEE Nuclear Science Symposium, Medical Imaging Conference (NSS-MIC 2011).
- M. Conti, C. Lois, K. Hubner, M. Long, B. Jakoby, W. Howe, M. Casey, V. Panin, C. Watson, B. Bendriem, et al., Clinical evaluation of time-of-flight imaging in European Journal Of Nuclear Medicine and Molecular Imaging, SPRINGER 233 SPRING ST, NEW YORK, NY 10013 USA, pp. S166-S166.
- P. Aguiar, B. Couce, A. Iglesias, C. Lois. New developments in molecular imaging: positron emission tomography time-of-flight (TOF-PET). *Nuclear Espana* **2011**.
- O. Evbuomwan, F. Schroeder, C. Lois, M. Gee, J. Hooker. Synthesis and evaluation of a radiolabeled stapled peptide for monitoring the apoptotic state of tumors. *Journal of Nuclear Medicine* **2014**, *55*, 1043–1043.
- P. Aguiar, J. Silva-Rodriguez, D. González-Castaño, F. Pino, M. Sanchez, M. Herranz, A. Iglesias, C. Lois, A. Ruibal. A portable device for small animal SPECT imaging in clinical gamma-cameras. *Journal of Instrumentation* 2014, 9, P07004.
- C. Lois, J. Kupferschläger, I. Bezrukov, H. Schmidt, M. Werner, J. Mannheim, B. Pichler, N. Schwenzer, T. Beyer, Combined whole-body PET/MR imaging: MR contrast agents do not affect the quantitative accuracy of PET following attenuation correction in 97th Scientific Assemble and Annual Meeting of the Radiological Society of North America (RSNA 2011).
- O. Steinkamp, D. Volyanskyy, M. Agari, C. Bauer, J. Blouw, W. Hofmann, S. Löchner, F. Maciuc, M. Schmelling, N. Smale, et al., Production and Quality Assurance of Detector Modules for the LHCb Silicon Tracker in 10th ICATPP Conference on Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications.
- H. Schmidt, N. Schwenzer, I. Bezrukov, A. Kolb, F. Mantlik, J. Kupferschläger, C. Lois, A. Sauter, C. Brendle, C. Pfannenberg, et al., First Results on Patients and Phantoms of a Fully Integrated Clinical Whole-Body PET/MRI in 2011 IEEE Nuclear Science Symposium, Medical Imaging Conference (NSS-MIC 2011).
- F. Popota, P. Aguiar, S. España, C. Lois, J. Udias, D. Ros, J. Pavia, J. Gispert. Monte Carlo simulations versus experimental measurements in a small animal PET system. A comparison in the NEMA NU 4-2008 framework. *Physics in Medicine and Biology* **2015**, *60*, 151.
- R. Bernhard, E. Pérez-Trigo, J. Van Tilburg, O. Steinkamp, V. Yakovenko, O. Schneider, K. Vervink, L. Nicolas, M. Bettler, A. Bay, et al., *The LHCb silicon tracker*, Tech. Rep., **2007**.

Teaching

Massachusetts Institute of Technology

Cambridge, MA

"An introduction to biomedical imaging" (IAP)

Jan. 2015

Hospital Clínic de Barcelona

Spain

- "IX Course on Instrumentation and Quality Control in Nuclear Medicine" Nov. 2013
- "VIII Course on Instrumentation and Quality Control in Nuclear Medicine" Nov. 2011

University of Santiago de Compostela

Santiago de Compostela, Spain

- "Physics II" (BSc in Chemistry) 2010 & 2011
- "Medical Applications of Ionizing Radiation" (Ms in Physics) 2009 & 2010
- "Technological Applications of Ionizing Radiation" (Ms in Physics) 2010 & 2011

Professional service

Chair of the "PET imaging" session at the 2011 IEEE Nuclear Science Symposium and Medical Imaging Conference, Valencia, Spain.

Referee for Medical Physics, Physics in Medicine and Biology, and Zeitschrift für Medizinische Physik.

Management Committee Member to EU COST Action TD1007 for "Bimodal PET-MRI molecular imaging technologies and applications for in vivo monitoring of disease and biological processes".

Reviewer for the Instituto de Salud Carlos III Grants 2015, in the modality of Technological Developments for Health Applications (AES 2015).

Professional licenses

Radioactive Facilities Supervisor License, Spanish Nuclear Safety Council, 2009.