CURRICULUM VITAE

Dr Filipe M. Ferreira
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Google Scholar profile: https://scholar.google.co.uk/citations?user=XQLAM90AAAAJ&hl=en

EMPLOYMENT

- **Marie Sklodowska-Curie Research Fellow** 2016-present
  Aston University, Aston Triangle, Birmingham, UK
- **Research Associate** 2014 – 2015
  Aston University, Aston Triangle, Birmingham, UK
- **Research Engineer** 2009 – 2014
  Optical Networks Research & Technology Division, Coriant, Alfragide, Portugal
- **Research Student** 2009
  Instituto de Telecomunicações, Coimbra, Portugal

EDUCATION

- **Aston University, United Kingdom**
  Postgraduate Diploma in Learning & Teaching in Higher Education - Ongoing 2017
  Postgraduate Certificate in Learning & Teaching in Higher Education - Distinction 2016
- **University of Coimbra, Portugal**
  Industrial PhD in Electrical Engineering - Summa Cum Laude 2010 – 2014
  BEng+MEng in Electrical Engineering with specialisation in Telecommunications 2004 – 2009
  GPA 19/20 (annual admission: 100 students)

RESEARCH PROJECT PARTICIPATION

- **Project H2020-MSCA-IF-2014 HSPACE– Aston University, United Kingdom** 2016 – present
  Main contributions: Semi-analytical modelling of delay-managed few-mode fibre links in the intermediate-coupling regime: group-delay statistics and nonlinear transmission.
- **Project ICT-FP7 INSPACE – Aston University, United Kingdom** 2014 – 2017
  Main contributions: Generalized statistical description of group delays evolution in few-mode fibres, and techniques to mitigate the impact of Kerr nonlinearities in few-mode fibres.
- **Project ICT-FP7 ModeGap – Coriant, Portugal** 2010 – 2014
  Main contributions: Few-mode fibre nonlinear transmission model, fibre refractive-index optimization, distance reach extension methods, and mode multiplexers optimization.
- **Project ICT-FP7 FUTON – Coriant, Portugal** 2009 – 2010
  Main contributions: Schemes for the transmission of digital fixed traffic (GPON or WDM) and radio signals (GSM, UMTS and LTE) over the same fibre, techniques for millimetre-wave generation, and performance assessment through simulation and experimental validation.

- **Project PTDC RoFnet – Instituto de Telecomunicações, Portugal** 2009
  Main contributions: Development of an optical single side band modulation transmitter for radio over fibre systems using subcarrier multiplexing over the millimetre waves band.

AWARDED INDIVIDUAL FELLOWSHIPS

- **Marie Sklodowska-Curie Individual Fellowship,** funded by the EU, £145,674.00 2014
- **Industrial PhD Fellowship,** funded by Nokia Siemens/Coriant and the Portuguese Foundation for Science and Technology, £61,000.00 2010

SKILLS and EXPERIENCE

My experience working on several research projects, assuming the responsibility for leading important tasks such as the delivery of research reports, the management of budgets and the implementation of experimental setups, both in industry and academy, allowed me to acquire greater flexibility to address different problems, to work within deadlines and to solve problems. These experiences have also contributed to the development of my teamwork and communication skills.

Specifically, I have acquired hands-on experience with:
- all-fibre photonic circuit design and implementation;
- all-fibre devices design and implementation (e.g. interferometers, piezo actuated phase-shifters, fibre heating phase-shifter);
- device control implementation programming microcontrollers with USB and Ethernet interface (e.g. phase shifters, EDFA);
- electronic circuit design and implementation (e.g. lock-in amplifier, photodiode transimpedance amplifier circuit);
- instrument control and data acquisition using Labview/Matlab (e.g. scopes, spectrum analysers, EDFAs, optical modulators, lasers…);
- device and system analytical modelling;
- device and system numerical modelling using C++ and Matlab (e.g. optical fibres, optical amplifiers, optical modulators, DBP, OPC…);
- design and implementation of distributed computing systems (300 core pool with - CMD interface and batch job submission);
- Monte Carlo simulations using distributed computing;
- device optimization using distributed computing (e.g. optical fibres).

TEACHING EXPERIENCE

- Optical Communications (final year UG and MSc) - **guest lecturer** 2015 – 2017
  Subjects: *Free-Space Optical Communications* (2 hours) and *Space Division Multiplexing* (2 hours).

- Transition Mathematics for Engineers (first year UG) - **teaching assistant** 2015 – 2017
  One hour per week per term, 14 tutorial sessions, exam marking, over 30 students per session.

- Mathematics for 1st year Engineers (first year UG) - **teaching assistant** 2015 – 2017
  One hour per week per term, 14 tutorial sessions, exam marking, over 30 students per session.

PhD STUDENTS SUPERVISION

- Abdallah A.I.Ali, Aston University — 2016 - present
  Subject: Combatting nonlinearity in Petabit communication systems

OTHER SUPERVISIONS

- State University of Campinas, São Paulo, Brazil – acting as PhD co-adviser of Lailson Santos

COMMISSIONS OF TRUST

- **IEEE UK & Ireland Section**
  PHO36 Chapter – Secretary — 2017-present
- **Technical Programme Committees**
  Track on Optical Components, Fibres and Devices
  International Microwave and Optoelectronics Conference (IMOC), 2017.
- **Institutional Boards**
  Research Fellows Deputy at AIPT Management Group
- **Journal Reviewing Activities**
  IEEE Photon. Technol. Lett., IEEE J. of Lightwave Technol., Opt. Express,
  Opt. Letters, etc.

PRIZES and AWARDS

- **BPI Prize** awarded to the best student of each degree course of the Faculty of Science and Technology of the University of Coimbra (last edition 2006). — 2004 – 2006
- **Merit Scholarship** awarded to the top 3% of students of the University of Coimbra. — 2004 – 2008
- **TOP3 prize** awarded to the top 3% of students of each degree course of the University of Coimbra. — 2004 – 2008

OUTREACH

- **Nuffield Research Placements** — 2017
  Building a 3dB Noise Figure Erbium-Doped Fibre Amplifier
  Under my supervision, three students in the first year of a post-16 STEM course, built a 3.3dB noise figure EDFA, during six-weeks. The amplifier was built as a standalone unit, rack-mountable, with a touch-screen control interface and html interface.
- **Aston University Engineering Academy** — 2017
  Programming a way through a maze
  Computer room hands-on, 30 students in groups of 2
- **Aston University Engineering Academy** — 2016
  Home Laser light - Monochromatic, Collimated and Coherent
  Lab demonstrations for 14 year olds, 4 groups of 30 students.
- **Lightfest Science Festival at Birmingham Library** — 2015
  Demonstrating signal interruption
  Outreach demonstration integrated at a science festival with over 12,000 attendees.

SEMINARS DELIVERED

- **Understanding Few-Mode Fibres** — 2015
  Instituto de Telemunicações, University of Coimbra
- **High Capacity Optical Transmission Systems based on Mode Diversity Multiplexing** — 2012

Workshop: 20 years of Instituto de Telecomunicações

- **How to enhance our communications infrastructure 100-fold to meet our next 25-year needs?** 2010
  Science and Technology Week, University of Coimbra

INVITED TALKS

- **Modelling of Linear and Nonlinear Impairments in Few-Mode Fibres** 2017
  Conference: International Microwave and Optoelectronics Conference, São Paulo, Brazil
  Authors: F. Ferreira, C. Sanchez, S. Sygletos, A. Ellis
- **On the Group Delay Statistics of Few-Mode Fibres with Intermediate Linear Mode Coupling** 2016
  Conference: International Conference on Transparent Optical Networks, Trento, Italy
  Authors: F. Ferreira, N. Suibhne, C. Sánchez, M. Sorokina, S. Sygletos, A. Ellis
- **Suppression of Nonlinear Distortion in Few-Mode Fibers using Strong Mode Coupling** 2016
  Conference: European Conference on Network and Optical Communications, Lisbon, Portugal
  Authors: F. Ferreira, N. Suibhne, C. Sánchez, M. Sorokina, S. Sygletos, A. Ellis
- **Impact of Inter-Modal Cross-Phase Modulation on the Performance of Mode- and Wavelength-Division-Multiplexing Systems** 2015
  Conference: Conference on Telecommunications, Aveiro, Portugal
  Authors: F. Ferreira, D. Fonseca, H. Silva
- **Impact of Inter-Modal Four-Wave Mixing on the Performance of Mode-and Wavelength-Division-Multiplexing Systems** 2015
  Conference: International Conference on Transparent Optical Networks, Budapest, Hungary
  Authors: F. Ferreira, D. Fonseca, S. Sygletos, A. Ellis, and H. Silva
- **Design of few-mode fibers with up to 12 modes and low differential mode delay** 2014
  Conference: International Conference on Transparent Optical Networks, Graz, Austria
  Authors: F. Ferreira, D. Fonseca, and H. Silva

PATENTS

- S. Kruk, K. Chong, D. Neshev, Y. Kivshar, N. MacSuibhne, **F. Ferreira**, A. Ellis, and S. Turitsyn, "Metasurface optical spatial mode modulator and method," Australian Provisional Patent Application No. 2017903177 2017
- **F. Ferreira**, N. Mac-Suibhne, A. Ellis, S. Sygletos, M. Sorokina, C. Costa, "Twin-Fibres for Communication beyond the Kerr Nonlinearity Limit," GB application 1605120.3. 2016
- **F. Ferreira**, A. Ellis, N. Mac-Suibhne, and C. Costa, "Method and apparatus for pre-equalized downlink transmission in mode division multiplexed passive optical networks," GB application 1516759.6. 2015
- **F. Ferreira**, A. Ellis, and N. Mac-Suibhne, "Mode division multiplexed passive optical network with optical domain equalization,". PCT/GB2016/051904 2015

BOOK CHAPTERS

- **F. Ferreira**, and A. Ellis, "Spatial multiplexing: modelling," in "The Potential for Networks with Capacities Exceeding the Nonlinear-Shannon Limit," to be published. 2017
- **F. Ferreira**, D. Fonseca, and H. Silva, "Optical Fiber Transmission Systems Based on Mode-Division Multiplexing," Scholars Press, 2014. 2014

PEER REVIEWED JOURNAL PAPERS

J1. S. Kruk, **F. Ferreira**, N. Mac-Suibhne, I. Kravchenko, A. Ellis, D. Neshev, C. Tsekrekos, S. Turitsyn, and Y. Kivshar, "Dielectric metasurfaces for fast mode modulation and space-division multiplexing," to be submitted to OSA Optica.

J2. **F. Ferreira**, C. Costa, S. Sygletos, and A. Ellis, "Semi-Analytical Modelling of Linear Mode Coupling in Few-Mode Fibers," OSA/IEEE Journal of Lightwave Technology, pre-print version, 2017.

J3. O. Sidelnikov, S. Sygletos, **F. Ferreira**, M. Fedoruk, "Numerical modelling of multimode fibre-optic communication lines," Quantum Electronics, vol. 46, no. 1, pp. 76-80, 2016.

J4. M. McCarthy, M. Al Kahteeb, **F. Ferreira** and A. D. Ellis, "PMD Tolerant Nonlinear Compensation using In-line Phase Conjugation," OSA Optics Express vol. 24, no. 4, pp. 3385-3392, 2016.

J5. A. Lobato, J. Rabe, **F. Ferreira**, M. Kuschnerov, B. Spinnler, and B. Lankl, "Near-ML detection for MDL-impaired few-mode fiber transmission," OSA Optics Express, vol. 23, no. 8, pp. 9589-9601, April 2015.

J6. **F. Ferreira**, D. Fonseca, and H. da Silva, "Design of few-mode fibers with m-modes and low differential mode delay," OSA/IEEE Journal of Lightwave Technology, vol. 32, no. 3, pp. 353–360, February 2014.

J7. **F. Ferreira**, D. Fonseca, A. Lobato, B. Inan, and H. Silva, "Reach improvement of mode division multiplexed systems using fiber splices," IEEE Photonics Technology Letters, vol. 25, no. 12, pp. 1091–1094, June 2013.

J8. **F. Ferreira**, D. Fonseca, and H. Silva, "Design of few-mode fibers with arbitrary and flattened differential mode delay," IEEE Photonics Technology Letters, vol. 25, no. 5, pp. 438–441, March 2013.

J9. A. Lobato, **F. Ferreira**, B. Inan, S. Adhikari, M. Kuschnerov, A. Napoli, B. Spinnler, and B. Lankl, "Maximum-likelihood detection in few-mode fiber transmission with mode-dependent loss," IEEE Photonics Technology Letters, vol. 25, no. 12, pp. 1095–1098, June 2013.

J10. **F. Ferreira**, S. Jansen, P. Monteiro, and H. Silva, "Nonlinear semi-analytical model for simulation of few-mode fiber transmission," IEEE Photonics Technology Letters, vol. 24, no. 4, pp. 240–242, February 2012

J11. A. Lobato, **F. Ferreira**, M. Kuschnerov, D. van den Borne, S. L. Jansen, A. Napoli, B. Spinnler, and B. Lankl, "Impact of mode coupling on the mode-dependent loss tolerance in few-mode fiber transmission," OSA Optics Express, vol. 20, no. 28, pp. 29776–29783, December 2012.

J12. B. Inan, B. Spinnler, **F. Ferreira**, D. van den Borne, A. Lobato, S. Adhikari, V. A. J. M. Sleiffer, M. Kuschnerov, N. Hanik, and S. L. Jansen, "DSP complexity of mode-division multiplexed receivers," OSA Optics Express, vol. 20, no. 10, pp. 10859–10869, May 2012.

J13. D. Wake, A. Nkansah, N. Gomes, G. de Valicourt, R. Brenot, M. Violas, Z. Liu, **F. Ferreira**, and S. Pato, "A comparison of radio over fiber link types for the support of wideband radio channels," OSA/IEEE Journal of Lightwave Technology, vol. 28, no. 16, pp. 2416–2422, August 2010.

PEER REVIEWED INTERNATIONAL CONFERENCES

C1. **F. Ferreira**, C. Costa, S. Sygletos, and A. Ellis, "Nonlinear Compensation Using Digital Back-Propagation in Few-Mode Fibre Spans with Intermediate Coupling," in Proc. ECOC, p. W.1.D.3, September 2017.

C2. C. Costa, **F. Ferreira**, J. Wei, S. Sygletos, and A. Ellis, "Training-Aided Channel Estimation and Equalization in SDM Systems with MISO Pre-convergence under Strong Coupling," in Proc. ECOC, September 2017.

C3. V. Gordienko, M. Stephens, **F. Ferreira**, and N. Doran, "Gain Spectrum Shaping Technique for

One-Pump Fibre Optical Parametric Amplifier," in Proc. ECOC, September 2017.

C4. **F. Ferreira,** C. Sanchez, S. Sygletos, and A. Ellis, "Modelling of Linear and Nonlinear Impairments in Few-Mode Fibres," in Proc. International Microwave and Optoelectronics Conference, São Paulo, Brazil, August 2017. (INVITED)

C5. L. Santos, **F. Ferreira**, and D. Mello, "Sub-Band-Based Transmission for Mode-Multiplexed Optical Systems," in Proc. ICTON, p. Mo.D1.5, July 2017 (INVITED)

C6. **F. Ferreira**, C. Costa, N. MacSuibhne, S. Sygletos, and A. Ellis, "Nonlinear Transmission Performance in Delay Managed Few-Mode Fiber Links with Intermediate Coupling," in Proc. OFC, p. Th2A.53, March 2017.

C7. T. Zhang, M. Mccarthy, S. Sygletos, **F. Ferreira**, and A. D Ellis, "Single sideband FBMC system for 2-km SMF transmission," in Proc. Asia Communications and Photonics Conference, p. AS1B. 2, November 2016.

C8. **F. Ferreira**, C. Costa, N. MacSuibhne, S. Sygletos, and A. Ellis, "Nonlinear distortion in mode delay compensated few-mode fibre spans with intermediate coupling," in Proc. ECOC, p. Tu.2.D.2, September 2016.

C9. C. Costa, **F. Ferreira**, N. MacSuibhne, S. Sygletos, and A. Ellis, "Receiver memory requirement in mode delay compensated few-mode fibre spans with intermediate coupling," in Proc. ECOC, p. Tu.1.E.4, September 2016.

C10. **F. Ferreira**, N. MacSuibhne, C. Sánchez, S. Sygletos, and A. Ellis, "Advantages of Strong Mode Coupling for Suppression of Nonlinear Distortion in Few-Mode Fibers," in Proc. OFC, p. Tu2E.3, 2016.

C11. **F. Ferreira,** N. MacSuibhne, C. Sánchez, M. Sorokina, S. Sygletos, and A. Ellis, "On the Group Delay Statistics of Few-Mode Fibres with Intermediate Linear Mode Coupling," in Proc. ICTON, p. Mo.D1.1, 2016 (INVITED).

C12. N. MacSuibhne, **F. Ferreira**, M. McCarthy, A. Mishra, and A. Ellis, "The effect of high optical power on modern fibre at 1.5 μm," in Proc. ICTON, p. Tu.P.24, 2016.

C13. **F. Ferreira**, N. MacSuibhne, C. Sánchez, M. Sorokina, S. Sygletos, and A. Ellis, "Suppression of Nonlinear Distortion in Few-Mode Fibers using Strong Mode Coupling," in Proc. Eur. Conf. on Netw. and Opt. Communications (NOC), p. S2.3, 2016. (INVITED)

C14. **F. Ferreira**, N. MacSuibhne, S. Sygletos, and A. Ellis, "Few-mode fibre group-delays with intermediate coupling," in Proc. ECOC, p. Th.1.6.1, September 2015.

C15. **F. Ferreira**, S. Sygletos, and A. Ellis, "Impact of Linear Mode Coupling on the Group Delay Spread in Few-Mode Fibers," in Proc. OFC, p. Tu2D.1, March 2015.

C16. **F. Ferreira**, D. Fonseca, and H. Silva, "Impact of Inter-Modal Cross-Phase Modulation on the Performance of Mode- and Wavelength-Division-Multiplexing Systems," Conference on Telecommunications (ConfTele), 2015 (INVITED).

C17. **F. Ferreira**, D. Fonseca, S. Sygletos, A. Ellis, and H. Silva, "Impact of Inter-Modal Four-Wave Mixing on the Performance of Mode-and Wavelength-Division-Multiplexing Systems," in Proc. ICTON, 2015 (INVITED).

C18. M. Sorokina, S. Sygletos, **F. Ferreira**, A. Perentos, A. Ellis, and S. Turitsyn, "Advanced 3R regenerator scheme for high spectral efficient signal waveforms," in Proc. ICTON, p. Mo.D1.5, 2015.

C19. S. Sygletos, S. Fabbri, **F. Ferreira**, M. Sorokina, A. Perentos, andA. Ellis, "All-optical add-drop multiplexer for OFDM signals," in Proc. ICTON, p. We.A1.1, 2015.

C20. N. MacSuibhne, M. McCarthy, S. Le, S. Sygletos, **F. Ferreira**, and A. Ellis, "Optical fibre limits: an approach using ASE channel estimation," in Proc. Progress in Electromagnetics Research

Symposium (PIERS), July 2015.

C21. **F. Ferreira**, D. Fonseca, H. Silva, "Design of Few-Mode Fibers With Up to 12 Modes and Low Differential Mode Delay", Proc. ICTON, p. Th.B1.2, July 2014 (INVITED).

C22. A. Lobato, **F. Ferreira**, J. Rabe, M. Kuschnerov, B. Spinnler, B. Lankl, "Enhanced Performance for MDL-impaired Few-Mode Fiber Transmission", Proc. Optoelectronics and Communications Conf. (OECC), p. TU4B-3, July 2014.

C23. A. Lobato, **F. Ferreira**, J. Rabe, M. Kuschnerov, B. Spinnler, B. Lankl, "Mode scramblers and reduced-search maximum-likelihood detection for mode-dependent-loss-impaired transmission," in Proc. ECOC, p. Th.2.C.3, September 2013.

C24. A. Lobato, **F. Ferreira**, J. Rabe, B. Inan, S. Adhikari, M. Kuschnerov, A. Napoli, B. Spinnler, B. Lankl, "Mode-dependent-loss mitigation for mode-division multiplexed systems," in Proc. Signal Processing in Photonic Commun. (SPPcom), p. SPT4D.3, July 2013.

C25. **F. Ferreira**, D. Fonseca, and H. Silva, "On the dependence of differential mode delay in few-mode fibers on the number of modes," in Proc. ICTON, p. Tu.C2.3, June 2013.

C26. A. Lobato, **F. Ferreira**, J. Rabe, B. Inan, S. Adhikari, M. Kuschnerov, A. Napoli, B. Spinnler, B. Lankl, "On the mode-dependent loss compensation for mode-division multiplexed systems," in Proc. ICTON, p. Tu.B1.5, June 2013.

C27. **F. Ferreira**, D. Fonseca, and H. Silva, "Design of few-mode fibers with low and flattened differential modal delay," in Proc. Conf. on Telecommunications (ConfTele), May 2013.

C28. A. Lobato, **F. Ferreira**, M. Kuschnerov, D. van den Borne, S. Jansen, B. Spinnler, B. Lankl, "Impact of mode coupling on the mode-dependent loss tolerance in few-mode fiber transmission," in Proc. ECOC, p. Tu.1.C.3, September 2012.

C29. B. Inan, B. Spinnler, **F. Ferreira**, D. van den Borne, S. Adhikari, N. Hanik, J. Sander, "Complexity analysis for higher order few mode fiber DSP equalizers," in Proc. ECOC, p. Th.2.D.5, September 2012.

C30. **F. Ferreira**, P. Monteiro, and H. Silva, "Semi-analytical model for linear modal coupling in few-mode fiber transmission," in Proc. ICTON, p. Th.A1.5, July 2012.

C31. B. Inan, S. Jansen, B. Spinnler, **F. Ferreira**, D. van den Borne, M. Kuschnerov, A. Lobato, S. Adhikari, V. Sleiffer, N. Hanik, "DSP requirements for MIMO spatial multiplexed receivers," in Proc. IEEE Photonics Society Summer Topical Meeting, p. MC4.4, July 2012.

C32. B. Inan, B. Spinnler, D. van den Borne, **F. Ferreira**, A. Lobato, S. Adhikari, V. Sleiffer, N. Hanik, S. Jansen, "Equalizer complexity of mode-division multiplexed coherent receivers," in Proc. ICTON, p. Th.A1.4, July 2012.

C33. **F. Ferreira**, D. van den Borne, H. Silva, and P. Monteiro, "Crosstalk optimization of phase masks for mode multiplexing in few mode fibers," in Proc. OFC, p. JW2A.37, March 2012.

C34. B. Inan, B. Spinnler, **F. Ferreira**, A. Lobato, S. Adhikari, V. Sleiffer, D. van den Borne, N. Hanik, S. Jansen, "Equalizer complexity of mode division multiplexed coherent receivers," in Proc. OFC, p. OW3D.4, March 2012.

C35. A. Lobato, **F. Ferreira**, B. Inan, M. Kuschnerov, D. van den Borne, S. Jansen, B. Spinnler, B. Lankl, "The Impact of Differential Mode Delay on Mode-Division Multiplexed Coherent Optical OFDM Transmission," in Proc. OFC, p. OTu2C.2, March 2012.

C36. **F. Ferreira**, S. Jansen, P. Monteiro, and H. Silva, "Nonlinear model for simulation of two-mode fiber transmission," in Proc. Symp. on Enabling Opt. Netw. (SEON), June 2011.

C37. **F. Ferreira**, S. Pato, P. Almeida, H. Silva, and P. Monteiro, "Dual band signal generation for millimeter-wave RoF Systems with subcarrier multiplexing," in Proc. Conf. on Telecommunications (ConfTele), April 2011.

C38. **F. Ferreira**, S. Pato, H. Silva, and P. Monteiro, "On supporting multiple signal formats over a FUTON system," in Proc. Europ. Conf. on Opt. Net. Design and Modeling (ONDM), February 2011.

C39. **F. Ferreira**, P. Almeida, C. Antunes, and H. Silva, "Reconstruction of the non-minimum phase response of chirped fiber Bragg gratings using an adaptive genetic algorithm," in Proc. IEEE World Congress on Computational Intelligence (WCCI), July 2010.

C40. D. Wake, A. Nkansah, N. Gomes, M. Violas, Z. Liu, S. Pato, **F. Ferreira**, G. de Valicourt, R. Brenot, "Design and performance of radio over fibre links for next generation wireless systems using distributed antennas," in Proc. IEEE Future Network and Mobile Summit (FNMS), June 2010.

C41. **F. Ferreira**, S. Pato, J. Pedro, and H. Silva, "Microwave link for transparent protection of optical access networks," in Proc. Europ. Conf. on Net. and Opt. Commun. (NOC), June 2010.

C42. S. Pato, **F. Ferreira**, P. Monteiro, and H. Silva, "On supporting multiple radio channels over a SCM-based distributed antenna system: a feasibility assessment," in Proc. ICTON, p. We.A3.5, June 2010.

C43. P. Almeida, **F. Ferreira**, and H. Silva, "Multiband signal generation for hybrid access networks using a single external modulator," in Proc Symp. on Enabling Opt. Netw. (SEON), June 2010.

C44. **F. Ferreira**, P. Almeida, and H. Silva, "Generation of 60 GHz RoF/SCM signals using upconversion and centimeter-wave photonic devices," in Proc Symp. on Enabling Opt. Netw. (SEON), June 2009.