

João Patrício | Curriculum Vitae

Instituto Politécnico de Tomar
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Education

University of Coimbra <i>PhD in Applied Mathematics,</i>	2007
Instituto Politécnico de Tomar <i>Adjunct Professor Access,</i>	2001
University of Coimbra <i>BSc in Mathematics,</i>	1987

Past and Current Positions

Instituto Politécnico de Tomar <i>Full Adjunct Professor</i>	Since October 2004
Instituto Politécnico de Tomar <i>Junior Adjunct Professor</i>	From October 2001 to September 2004
Instituto Politécnico de Tomar <i>Invited Adjunct Professor</i>	From February 1998 to September 2001
Instituto Politécnico de Tomar <i>Collaborator</i>	From October 1997 to February 1998
Instituto Superior Bissaya Barreto <i>Lecturer</i>	From October 1995 to September 1997
Universidade de Coimbra <i>Lecturer</i> Also Fellow at CERFACS - France	From July 1991 to September 1997
Universidade de Coimbra <i>Junior Lecturer</i>	From October 1987 to June 1991

Lecturing Activity

Instituto Politécnico de Tomar
MSc in Analytics and Business Intelligence: Mathematical Models for Decision Analysis and Support (partial), Multidisciplinary Project (partial)
MSc in Digital Content Production: Computer Graphics I, Computer Graphics II, Games and Augmented Reality
MSc in Chemical Technology: Mathematics and Computation, Process Optimization (partial)
MSc in Control and Industrial Electronics: Mathematical Modelling and Simulation
Business Intelligence Post-Graduate Course: Mathematical Models for Decision Analysis and Support (partial), Multidisciplinary Project (partial)
BSc in Civil Engineering: Mathematical Calculus III (partial), Operations Research, Linear Algebra

BSc in Computer Engineering: Logics and Scientific Computing, Operations Research, Linear Algebra

BSc in Eletrotechnical Engineering: Operations Research, Applied Mathematics, Linear Algebra

BSc in Chemical and Biochemical Engineering: Operations Research, Applied Numerical Methods, Statistical Methods, Linear Algebra

BSc in Environment and Biological Engineering: Operations Research, Applied Numerical Methods, Statistical Methods, Linear Algebra

BSc in Graphical Arts Technology: Mathematics III

Technical Course in Multimedia Product Development: Mathematics Applications

Technical Course in Accounting and Management: Mathematics (partial)

Technical Course in Information Systems Technology and Programming: Algorithms

Technical Course in Geographical Information Systems: Applied Mathematics (partial)

Technical Course in Electrical Installations and Industrial Automation: Applied Mathematics (partial)

Other Courses:: Training Programme “Introduction to Text Processing in \LaTeX ”

Trainees: High School Teachers, from March to May 2002

[Instituto Superior Bissaya Barreto](#).....

BSc in Management and Public Administration: Informatics

[Universidade de Coimbra](#).....

BSc Courses in Engineering: Linear Algebra

BSc in Mathematics: Computer Programming, Computer Programming, Numerical Analysis, Discrete Mathematics

Research Activities

[Research Interests](#).....

- Information Systems for *Smart Cities*.
- Computational Kernels for Linear and Nonlinear Optimization.
- Algorithms and Mathematical Models for Computer Graphics, Virtual Reality, Augmented Reality and Video Games.
- High Performance Computing.

[Invited Talks](#).....

- *Sistemas e apps para Smart Cities: de Tomar para o Mundo*, with J. Rosa, T. Domingos, G. Rodrigues, A. Araújo, P. Lemos, I. Costa, P. Luís (IBM), L. M. Oliveira and N. Madeira (IPT), Fórum Politécnico 5 - Tecnologias da Informação e Comunicação e Competências Digitais, Instituto Politécnico do Cávado e Ave, Barcelos, January 2017.
- *Smarter Fest: feeling the pulse of a Festival – Information, Security & Safety*, with H. Mourisca (IBM), and L. Oliveira and N. Madeira (IPT), Carnival Workshop, Instituto Politécnico de Tomar, November 2015.
- *A Matemática na Animação 3D*, with Miguel Abreu (SKETCHPIXEL), Escola Profissional de Vila Verde, January 2015.
- *(Alguma) Matemática na Animação Gráfica*, Semana Cultura da Escola Secundária de Santa Maria do Olival, April 2014.
- *Métodos Matemáticos em Animação*, with Miguel Abreu (SKETCHPIXEL), in “Seminário Animação + HTML5 + Android”, Instituto Politécnico de Tomar, May 2013.
- *A Matemática na Animação Gráfica*, com Miguel Abreu (SKETCHPIXEL), in “Tardes da Matemática”, organized by Sociedade Portuguesa de Matemática - Norte, Braga, Portugal, February 2013.

- *Interior-point algorithms for monotone complementarity problems and their applications*, in “20th Anniversary of Instituto de Telecomunicações”, Coimbra, Portugal, July 2012.
- *A Matemática na Animação Gráfica*, with Miguel Abreu (SKETCHPIXEL), in “A Matemática das Coisas”, organized by Sociedade Portuguesa de Matemática and Programa Ciência Viva, Lisboa, Portugal, May 2012.
- *Objetivos e realidades no ensino da Matemática a Cursos de Engenharia*, in “O Ensino da Engenharia para a Inovação e o Desenvolvimento”, IEEE Education Society - Portuguese Chapter, Tomar, Portugal, November 2008.

Other talks.....

- *SolarSystemGO - An Augmented Reality Based Game with Astronomical Concepts*, with M. C. Costa, J. A. Carrança and B. Farropo, CISTI 2018, Cáceres, Spain, June 2018.
- *Virtual and augmented reality with mobile platforms for learning astronomy in primary schools*, with M. C. Costa, World Conference on Learning, Teaching & Educational Leadership, Budapest, November 2016.
- *Framework for an intelligent operations center - architecture of decision support systems*, with J. Rosa, T. Domingos, G. Rodrigues, L. Oliveira and N. Madeira, CISTI 2016, Las Palmas de Gran Canaria, June 2016.
- *Emergency plans support systems — integration of safety and security operational procedures*, with A. Araújo, P. Lemos, I. Costa, L. Oliveira and N. Madeira, CISTI 2016, Las Palmas de Gran Canaria, June 2016.
- *Numerical computation and applications of nonnegative matrix factorizations*, with L. M. Fernandes, MatTriad 2011, Tomar, June 2011.
- *On the computation of a nonnegative matrix factorization and its application in telecommunications*, with L. M. Fernandes, J. Júdice e A. M. Almeida, Conftele2009, Santa Maria da Feira, May 2009.
- *Viagem Multimédia pelo Mundo dos Fractais*, with C. Andrade, Festa da Ciência Cultura e Tecnologia do Instituto Politécnico de Tomar, April 2008.
- *Números Complexos, Trigonometria e Aplicações*, Escola Secundária Marquesa de Alorna, Almeirim, May 2004.
- *An investigation of a nonlinear obstacle plate optimization problem*, with L. Fernandes, I. Figueiredo and J. Júdice, 18th International Symposium on Mathematical Programming, Copenhagen, August 2003.
- *Em torno da determinação das soluções de equações algébricas*, Instituto Politécnico de Tomar, March 2002.
- *A primal-dual interior point algorithm for the solution of an optimization thermal dispatch model*, with J. Júdice and M. C. Guedes, Optimization 2001, Aveiro, July 2001.
- *Fortran subroutines for computing a minimum cost flow using a truncated primal-infeasible dual-feasible network interior point method*, with J. Júdice, M. Resende and G. Veiga, 17th International Symposium on Mathematical Programming, Atlanta, August 2000.
- *PDNET: Subrotinas FORTRAN para resolução de problemas de fluxos em redes utilizando um algoritmo de pontos interiores*, with J. Júdice, L. Portugal, M. Resende and G. Veiga, IO2000 – 9º Congresso da APDIO, Setúbal, April 2000.
- *Interior Point algorithms for a General Linear Complementarity Problem*, with J. Júdice and L. M. Fernandes, EURO XVI, Brussels, July 1998.
- *Solution of large-scale monotone linear complementarity problems*, with J. Júdice and L. M. Fernandes, SIAM Conference on Optimization, Chicago, July 1992.
- *Solução de Problemas Lineares Complementares Estritamente Monótonos de Grandes Dimensões*, with J. J. Júdice and L. M. Fernandes, 5º Congresso da APDIO, Évora, April 1992.
- *Solution of large-scale strictly convex linear complementarity problems with bounds*, with J. J. Júdice, F. M. Pires and L. M. Fernandes, 14th International Symposium on Mathematical Programming, Am-

sterdam, August 1991.

- *Solution of large-scale strictly convex linear complementarity problems*, with J. J. Júdice, F. M. Pires and L. M. Fernandes, Workshop on Large-Scale Optimization, Coimbra, July 1991.
- *A truncated envelope preconditioning technique*, with J. J. Júdice, IMACS International Symposium on Iterative Methods in Linear Algebra, Brussels, April 1991.
- *Método de Newton Truncado para problemas de grandes dimensões de Optimização Não Linear sem restrições*, with J. J. Júdice, 1ª Conferência em Estatística e Optimização, Tróia, December 1990.
- *Uso do Método do Invólucro como Precondicionamento para a resolução de sistemas de equações lineares de grandes dimensões*, with J. J. Júdice, XV Jornadas Luso- Espanholas de Matemática, Évora, September 1990.
- *The Preconditioned Envelope Conjugate-Gradient Method*, with J. J. Júdice, Copper Mountain Conference on Iterative Methods, Copper Mountain, April 1990.
- *Um estudo do método do invólucro para sistemas de equações lineares de grandes dimensões*, with J. J. Júdice, Conference on Linear Algebra and Applications, Valencia, October 1989.

Publications

- Books:
 - *Sistemas de Equações Lineares*, with J. Júdice, Universidade de Coimbra, 1996.
- Theses:
 - *Algoritmos de Pontos Interiores para Problemas Complementares Monótonos e suas Aplicações*, PhD, Universidade de Coimbra, 2007.
 - *Algoritmos de Pontos-Interiores para Problemas de Optimização Linear e Quadrática*, Adjunct Professor Access, Instituto Politécnico de Tomar, 2001.
 - *Um Estudo do Método do Invólucro para Matrizes Esparsas Simétricas Positivas Definidas*, Pedagogical and Scientific Habilitation, Universidade de Coimbra, 1991.
- Papers in national journals with scientific refereeing:
 - *On the solution of a spatial equilibrium problem*, with J. Júdice, M. A. Coelho and L. Fernandes, *Investigação Operacional* 13(1993)119-134.
- Papers in international journals with scientific refereeing:
 - *On the natural merit function for solving complementarity problems*, with R. Andreani, J. Júdice and M. Martinez, *Mathematical Programming* 130(2011) 211 - 223.
 - *A projected-gradient interior-point algorithm for complementarity problems*, with R. Andreani, J. Júdice and M. Martinez, *Numerical Algorithms* 57(2011) 457 - 485.
 - *FORTTRAN subroutines for network flow optimization using an interior point algorithm*, with J. Júdice, L. Portugal, M. Resende and G. Veiga, *Pesquisa Operacional* 28(2008) 241 - 259.
 - *A study of preconditioners for network interior point methods*, with J. Júdice, L. Portugal, M. Resende and G. Veiga, *Computational Optimization and Applications* 24(2003) 5 - 35.
- Papers in Conference Proceedings with scientific refereeing:
 - *Augmented reality technologies to promote STEM learning*, with M. C. Costa, J. A. Carrançã and B. Farropo, *Actas de la 13ª Conferência Ibérica de Sistemas y Tecnologías de la Información CISTI 2018*.
 - *SolarSystemGO — An augmented reality based game with astronomical concepts*, with M. C. Costa, J. A. Carrançã and B. Farropo, *Actas de la 13ª Conferência Ibérica de Sistemas y Tecnologías de la Información CISTI 2018*.
 - *Emergency plans support systems — integration of safety and security operational procedures*, with A. Araújo, P. Lemos, I. Costa, L. Oliveira and N. Madeira, *Sistemas y Tecnologías de la Información — Actas de la 11ª Conferência Ibérica de Sistemas y Tecnologías de la Información CISTI 2016*, vol. 1, pp. 579-585.
 - *Framework for an intelligent operations center - architecture of decision support systems*, with J. Rosa, T. Domingos, G. Rodrigues, L. Oliveira and N. Madeira, *Sistemas y Tecnologías de la Información*

— Actas de la 11ª Conferência Ibérica de Systemas y Tecnologías de la Información CISTI 2016, vol. 1, pp. 645-649.

- *On the computation of a nonnegative matrix factorization and its application in telecommunications*, with L. Fernandes, J. Júdice e A. Almeida, Proc Conf. on Telecommunications — ConfTele 2009.

Member of scientific projects.....

- o *ORAL - Optimal Resource ALlocation*, Project FCT, 2004-2008.
- o *TRANSPARENTE- TRANSPorte, Acesso e Distribuição em REdes de ComuNicação óptica mulTiplEx-adas*, Project FCT, 2000-2002.
- o *Modelos Variacionais e Optimização*, Project PRAXIS XXI, 1997-2000.
- o *Solução de Problemas de Álgebra Linear Numérica e de Optimização e Aplicações em Engenharia Estrutural, Genética e de Finanças*, Project PRAXIS XXI, 1996-1999.
- o *Resolução de Problemas de Optimização Não Linear de Grandes Dimensões e Aplicações a Problemas de Engenharia Química*, Project INIC, 1990-1991.

Member of Scientific Societies and Research Centres.....

- o Sociedade Portuguesa de Matemática (SPM).
- o Associação Portuguesa de Investigação Operacional (APDIO).
- o Integrated Member of the Smart Cities Research Centre of Instituto Politécnico de Tomar.
- o External collaborator of Instituto de Telecomunicações.

Participation in the organization of conferences and other scientific events.....

CityHack

Tomar *May 2017*

11th International Conference on Computational Management Science

Lisboa *May 2014*

5th International Conference on Risk Analysis

Tomar *May and June 2013*

7th Workshop on Statistics, Mathematics and Computation

Tomar *May 2013*

2nd Workshop on Bio-Optimization

Lisboa *September 2012*

Jornadas de Classificação e Análise de Dados — JOCLAD

Tomar *March 2012*

Workshop sobre o Ensino da Investigação Operacional

Coimbra *February 2011*

Workshop on High Performance Computing

Coimbra *November 2010*

Workshop em Otimização em Transportes

Coimbra *November 2010*

Workshop Investigação Operacional nas Empresas (IONE)

Coimbra *October 2010*

Workshop IO: que desafios para 2010-2020?

Coimbra *October 2010*

EURO XXIV — European Conference on Operational Research

Lisboa *July 2010*

Iberian Conference in Optimization

Coimbra *November 2006*

3ª Conferência em Telecomunicações — CONFTELE 2001

Figueira da Foz

April 2001

Matemática Aplicada às Telecomunicações — Que Problemas?

Coimbra

September 1998

Optimization 98

Coimbra

July 1998

XVI Olimpíadas Nacionais de Matemática

Sociedade Portuguesa de Matemática

From 1997 to 1998

Workshop on Large-Scale Optimization

Coimbra

July 1991

Referee of scientific papers

- Actas da 13ª Conferência Ibérica de Sistemas e Tecnologias da Informação CISTI 2018
- Actas da 12ª Conferência Ibérica de Sistemas e Tecnologias da Informação CISTI 2017
- Actas da 11ª Conferência Ibérica de Sistemas e Tecnologias da Informação CISTI 2016
- Boletim da Sociedade Portuguesa de Matemática
- International Journal of Computer Mathematics
- Numerical Algorithms

Supervision of BSc and MSc projects and internships

- *SolarSystemGO*, Bruno Farropo, BSc in Computer Engineering, Instituto Politécnico de Tomar, in process (co-supervision with M. C. Costa, IP Tomar and P. Chorinca, Sketchpixel).
- *Realidade Aumentada — Conceitos e Aplicações à Astronomia e à Paleontologia*, Alexandre Carrança, MSc in Digital Content Production, Instituto Politécnico de Tomar, December 2017 (co-supervision with S. Figueiredo, IPT and M. C. Costa, IPT).
- *Internship at Sketchpixel*, Paulo Chorinca, MSc in Digital Content Production, Instituto Politécnico de Tomar, December 2015.
- *Internship at Sketchpixel*, Pedro Isidoro, MSc in Digital Content Production, Instituto Politécnico de Tomar, December 2015.
- *Por um pixel*, Patrícia Lopes, MSc in Digital Content Production, Instituto Politécnico de Tomar, December 2015.
- *Criação de plataformas digitais para a divulgação da atividade do conservador-restaurador*, Diana Moreira, MSc in Digital Content Production, Instituto Politécnico de Tomar, December 2014 (co-supervision with C. Falcão, IP Tomar).
- *Estudo de um processo de reciclagem de óleos lubrificantes usados*, Joana Gonçalves, MSc in Chemical Technology, Instituto Politécnico de Tomar, November 2011.

Management Activities

Activities at Instituto Politécnico de Tomar

Coordinator of the Smart Cities Research Center of IP Tomar

Since February 2018

Director of Escola Superior de Tecnologia de Tomar of IP Tomar

Since January 2015

Coordinator of the Research and Development Observatory of IP Tomar

Since December 2012

Coordinator of the Scientific Computing Center of IP Tomar

Since September 2007

- Member of the General Board of Instituto Politécnico de Tomar**
From November 2013 to December 2017
- Director of the Mathematics and Physics Department of IP Tomar**
From October 2011 to January 2015
- Director of the MSc Program in Digital Content Production**
From October 2011 to January 2015
- Coordinator of the Technical Course in ICT**
From September 2007 to September 2011
- Director of the Mathematics Area of ESTT of IP Tomar**
From September 2010 to September 2011
- Other activities**.....
- Centro Internacional de Matemática**
Executive Secretary *From May 2006 to April 2008*
- Polo de Coimbra do Instituto de Telecomunicações**
Manager of the ICT infrastructure *From March 1997 to July 2000*