Francesco BIANCONI
Curriculum vitae

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Department of Engineering
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Personal details

Born: 17 July 1971, Perugia, Italy
Gender: Male
Citizenship: Italian

Education

University degrees

- Doctor of Philosophy, *Computer-aided Mechanical Design*
  Università degli Studi di Perugia, Perugia, Italy — Jan. 2001

- Master of Engineering, *Mechanical Engineering*
  Università degli Studi di Perugia, Perugia, Italy — Apr. 1997

Other courses

- *Applied Data Science Specialization*, IBM/Coursera — Jun. 2020

Languages

- English: Advanced

  - Cambridge CB CAE (grade A – 81/100) — Apr. 2013
  - iBT TOEFL (104/120) — Dec. 2011

- Spanish: Advanced

  - DELE intermediate (95/100) — May 2006

- Italian: Native

IT & Programming skills

- Programming languages & VCS
    - C, C++, Java, Python and Git
- Digital typesetting & office automation
    - Microsoft Excel, Microsoft Word and LaTeX
- Scientific packages & data visualisation tools
    - Matlab, Mathematica and Tableau
- CAD/CAE
    - Autodesk AutoCAD, Autodesk Inventor and SolidWorks

Employment

- *Associate professor*, Department of Engineering, Università degli Studi di Perugia, Italy
  Jul. 2015–present

- *Assistant professor*, Department of Engineering, Università degli Studi di Perugia, Italy
  Nov. 2000–Jun. 2015

- *CAD Engineer* (internship), Umbra Cuscinetti SpA, Foligno (Italy)   Oct.–Nov. 1998

- *Secondary school teacher* (Textile Technologies), Istituto Professionale Statale per l'Industria e L'Artigianato, Perugia (Italy)   Dec. 1997–Jun. 1998

- *Secondary school teacher* (Civil and Industrial Plants), Istituto Tecnico Statale per Geometri, Perugia (Italy)   Dec. 1997–Jun. 1998

- *Secondary school teacher* (Applied Mechanics), Istituto Tecnico Industriale Statale, Foligno (Italy)   Jun.–Jul. 1997

Visiting positions

- *Academic visitor*, School of Mathematics, Computer Science and Engineering; City, University of London, United Kingdom   Sep.–Dec. 2018

- *Academic visitor*, School Electronic Engineering and Computer Science; Queen Mary, University of London, United Kingndom   Sep.–Dec. 2015

- *Visiting research fellow*, School of Computing Sciences; University of East Anglia, United Kingdom   Oct.–Dec. 2010

- *Visiting researcher*, School of Industrial Engineering, Department of Engineering Design; Universidade de Vigo, Spain   Jun.–Jul. 2009
  Sep. 2007
  Sep. 2006
  Sep. 2005

Teaching

Undergraduate courses

- *Computer skills* (2 CFU[1]), Università degli Studi di Perugia, Department of Engineering, BEng Mechanical Engineering   2012–present

- *Technical Drawing* (5 CFU) + *Computer skills* (2 CFU), Università degli Studi di Perugia, Department of Engineering, BEng Industrial Engineering   2005–present

- *Technical Drawing* (6 CFU) + *Computer skills* (2 CFU), Università degli Studi di Perugia, Department of Engineering, BEng Management Engineering   2017–present

- *Machine Drawing* (10 CFU) + *Computer skills* (2 CFU), Università degli Studi di Perugia, Department of Engineering, BEng Mechanical Engineering   2008–2012

- *Machine Drawing* (6 CFU) Università degli Studi di Perugia, Department of Engineering, BEng Mechanical Engineering   2000–2007

- *Technical Drawing* (5 CFU) Università degli Studi di Perugia, Department of Engineering, BEng Materials Engineering   2000–2004

- *CAD Laboratory* (2 CFU) Università degli Studi di Perugia, Department of Engineering, BEng Materials Engineering   2003–2005

Post-graduate courses

- *Product Design and Development* (6 CFU), Università degli Studi di Perugia, Department of Engineering, MEng Industrial Engineering   2009–2010

- *Design Methods of Industrial Engineering* (6 CFU), Università degli Studi di Perugia, Department of Engineering, MEng Mechanical Engineering   2008–2009

Post-master courses and continuous education

- *Computer-aided Design* (2,75 CFU), Università degli Studi di Perugia, Graduate Teacher Training Programme   2005

- *Computer-aided Design* (4 CFU), Università degli Studi di Perugia, Faculty of Engineering post-master course in Materials Engineering   2004

- *Technical Drawing I* (1,75 CFU), Università degli Studi di Perugia, Graduate Teacher Training Programme   2002

- *Technical Drawing II* (2 CFU), Università degli Studi di Perugia, Graduate Teacher Training Programme   2003

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[1]Stands for *Credito Formativo Universitario*. This is the unit used in the Italian higher education system to measure and assess the student's work and effort. The minimum number of required credits is 180 for a Bachelor's and 120 for a Master's degree.

Short courses

- *Fundamentals of Engineering Drawing: Theory and Applications* (10h), FAIST Componenti S.p.A, Montone, Italy, Feb. 2011

- *Fundamentals of Pattern Recognition and Image Processing* (10h), Universidade de Vigo, Spain, Doctoral Programme in Environmental Engineering Jun. 2009

- *Introduction to Technical Drawing* (15h), Black & Decker Italia, Corciano, Italy Dec. 2008–Jan. 2009

- *Introduction to CAD/CAE* (10h), Master in Virtual Engineering, ITT s.c.a.r.l, Umbertide, Italy 2005

- *Introduction to Object-oriented Programming in C/C++*, Università degli Studi di Perugia, Italy, Doctoral Programme in Industrial Engineering Apr.–May 2004

Teaching in Erasmus interchange programmes

- *Expresión Gráfica* (Technical Drawing, 6h). BSc Energy Engineering and Mining, and BSc Energy Resources and Engineering, Universidade de Vigo, Spain Dec. 2013

- *Expresión Gráfica* (Technical Drawing, 6h). BSc Engineering of Industrial Technologies, BSc Management Engineering, BSc Electrical Engineering, BSc Mechanical Engineering, BSc Industrial Automation and Electronic Engineering, and BSc Industrial Chemical Engineering, Universidade de Vigo, Spain Jan. 2012

- *Expresión Gráfica* (Technical Drawing, 8h). BSc in Industrial Engineering, Universidade de Vigo, Spain Apr. 2019

Talks

- *Advances in modelling and analysis of the human body by computational imaging* (with G. Pascoletti). Keynote lecture, 2nd International Congress on Engineering Sciences and Multidisciplinary Approaches, Istanbul, Turkey 18 Sep. 2021

- *Radiomics in medical imaging: an overview*. Invited talk, IET Webinar Recent advances in Medical Image Analysis 25 Jun. 2021

- *Texture and colour descriptors for visual recognition: historical overview and applications to computer vision and robotics*. Keynote lecture, The 2020 International Conference on Control, Automation and Diagnosis (ICCAD'20), Paris, France 7 Oct. 2020

- *Role of artificial intelligence techniques (automatic classifiers) in molecular imaging modalities in neurodegenerative diseases* (with B. Palumbo). Invited talk, short course in Big Data, Radiomics & Artificial Intelligence; Italian Association for Medical Physics (AIFM), Reggio Emilia, Italy 15-16 Dec. 2017

- *Towards a procedural model for CAD data exchange*; 5th workshop on Design Tools and Methods in Industrial Engineering, Pisa, Italy, 21-23 Mar. 2005

- *Collaborative CAD modeling and construction of augmented CAD models*; 4th workshop on Design Tools and Methods in Industrial Engineering, Erice, Italy   29 Sep.–1 Oct. 2003

- *Approaches for integration of CAD/CAM/CAE systems*; 3rd Workshop on Design Tools and Methods in Industrial Engineering, Firenze, Italy   27-28 Jun. 2002

- *Interface-based methods for data exchange among CAx systems*; 2nd Workshop on Design Tools and Methods in Industrial Engineering, Perugia, Italy   5-6 Jul. 2001

- *Collaborative design and data exchange through STL files*; 1st Workshop on Design Tools and Methods in Industrial Engineering, Parma, Italy   Sep. 2000

Seminars

- *Texture and colour descriptors for visual recognition: an overview of methods applications.* Doctoral programme in Industrial and Information Engineering, Università degli Studi di Perugia, Italy 23 Jun. 2021

- *Hand-designed descriptors vs. pre-trained convolutional networks: a comparison of two strategies for colour texture classification.* School of Mathematics, Computer Science and Engineering; City, University of London, United Kingdom   20 Nov. 2018

- *Texture description through histograms of equivalent patterns: A unifying Framework for LBP and related methods.* School of Computing Sciences, University of East Anglia, United Kingdom 9 Dec. 2015

- *Texture description through histograms of equivalent patterns: A unifying Framework for LBP and related methods.* School of Electronic Engineering and Computer Science; Queen Mary, University of London, United Kingdom   22 Sep. 2015

- *Introduction to computer vision*, School of Industrial Engineering, Universidade de Vigo, Spain 21 Jan. 2014

- *Fundamentals of pattern recognition and colour image analysis*, School of Industrial Engineering, Universidade de Vigo, Spain   27 Nov. 2012

- *Introduction to pattern recognition and computer vision with applications in the industry*, School of Industrial Engineering, Universidade de Vigo, Spain   24 Jan. 2012

- *Colour vision and pattern recognition.* School of Industrial Engineering, Universidad de Vigo, Spain   11 Jan. 2011

- *Automatic characterization of materials appearance through texture and colour analysis.* School of Computing Sciences, University of East Anglia, United Kingdom   15 Oct. 2010

- *Data exchange among CAD/CAM/CAE systems: problems and perspectives.* Università degli Studi dell'Aquila, Italy   16 Dec. 2004

Tutorials

- *Colour texture analysis and classification* (with C. Cusano and P. Napoletano), 5th Computational Colour Imaging Workshop (CCIW'17), Milan, Italy   29 Mar. 2017

Supervision of PhD dissertations

- R. Bello-Cerezo *Colour texture classification at the end of the 'early' years: hand-designed descriptors or pre-trained convolutional neural networks?* Doctoral Programme in Industrial and Information Engineering, Università degli Studi di Perugia, Italy   Apr. 2019

Supervision of BSc and MSc theses

- Thirty BSc and MSc theses within the Department of Engineering, Università degli Studi di Perugia, Italy

- Eight MSc theses within the School of Industrial Engineering, Universidade de Vigo, Spain

Research projects

As principal investigator

- *Caratteristiche di forma, colore e tessitura per l'analisi di immagini piane e volumetriche: metodi ed applicazioni* (*Shape, colour and texture features for the analysis of two- and three-dimensional images: methods and applications*). Fundamental research grants, Department of Engineering, Università degli Studi di Perugia, Italy. Amount granted: € 2.751,32.   2020-2021

As investigator/participant

- *Artificial intelligence for Earth observation.* Fundamental research grants, Department of Engineering, Università degli Studi di Perugia, Italy. Amount granted: € 3000,00.   2021-2022

- *Algoritmi classici e di Machine Learning per lo sviluppo di modelli sperimentali "data driven" per applicazioni robotiche e per la classificazione di prodotti industriali* (*Traditional and Machine Learning algorithms for developing data-driven robotics applications and for automatic classification of industrial products*). Fundamental research grants, Department of Engineering, Università degli Studi di Perugia, Italy. Amount granted: € 5600,00.   2019-2020

- *Identificación basada en objetos de cultivos hortícolas bajo invernadero a partir de stereo imágenes del satélite WorldView-3 y series temporales de Landsat-8 – Ref. AGL2014-56017-R* (*Object-based identification of greenhouse horticultural crops through satellite stereo imagery from WorldView-3 and time series from Landsat-8*). Ministry of Economy and Competitiveness, Spain; Universidad de Almería, Spain. Amount granted: € 85.000,00.   2015-2018

- *BioMeTron: Un nuovo approccio integrato e multidisciplinare per lo studio, la gestione e la progettazioni di impianti biologici per l'energia e l'ambiente* (*A new multi-disciplinary, integrated approach for studying, designing and managing biological plants for energy and the environment*). Fundamental research grants, Department of Engineering, Università degli Studi di Perugia, Italy. Amount granted: € 14.000,00.   2015-2017

- *LIFE12 ENV/IT/000411 Enhanced material recovery and environmental sustainability for small scale waste management systems.* European Commission.   2013-2018

- *GEOEYE1-WV2: Generación de datos georeferenciados de muy alta resolución a partir de imágenes de los satélites GeoEye-1 Y WorldView-2 – ref. CTM2010-16573* (*Generation of high resolution*

geo-referenced data from GeoEye-1 and WorldView-2 satellite images). Ministry of Science and Education, Spain; Universidad de Almería, Spain. 2011-2013

- *EFESO: Environmental Friendly Energy from Solid Oxide Fuel Cells*. Ministry of Economic Development, Italy. Total amount granted: € 10.922.360,00 2009-2011

- *Modeling, simulation and experimental evaluation of materials for Industrial and Civil Engineering*. Consortium for the development of the University District, Terni, Italy. Amount granted: € 73.000,00 2007-2008

- *Sistemi innovativi per la gestione e la condivisione delle informazioni di prodotto in ambienti CAx (Innovative systems for sharing and managing product data in CAx environments)*. Ministry of Education, University and Research; PRIN programme 2005, Italy. Amount granted: € 73.000,00 2007-2008

Publications

Selected (sorted by date, newest first)

F. Bianconi and E. Brugnoli. Enumerating necklaces with transitions. *Bulletin of the Australian Mathematical Society*, 2021. In press

Edited books

[1] F. Bianconi, A. Fernández, and R.E. Sánchez-Yáñez, editors. *Texture and color in image analysis*. MDPI, 2021. Printed edition of the Special Issue Texture and Colour in Image Analysis, published in Applied Sciences

Book chapters

[1] F. Bianconi and A. Fernández. A unifying framework for LBP and related methods. In S. Brahnam, L. C. Jain, L. Nanni, and A. Lumini, editors, *Local binary patterns: New variants and applications*, volume 506 of *Studies in Computational Intelligence*, pages 17–46. Springer, 2014

[2] J.N. Kather, R. Bello-Cerezo, F. Di Maria, G.W. van Pelt, W.E. Mesker, N. Halama, and F. Bianconi. Classification of tissue regions in histopathological images: Comparison between pre-trained convolutional neural networks and local binary patterns variants. In L. Nanni, S. Brahnam, R. Brattin, S. Ghidoni, and L.C. Jain, editors, *Deep learners and deep learner descriptors for medical applications*, volume 186 of *Intelligent Systems Reference Library*, chapter 3, pages 95–115. Springer, 2020

Journal papers

[1] F. Bianconi, A. Fernández, F. Smeraldi, and G. Pascoletti. Colour and texture descriptors for visual recognition: A historical overview. *Journal of Imaging*, 7(11), nov 2021. Art. no. 245

[2] E. Chirikhina, A. Chirikhin, S. Dewsbury-Ennis, F. Bianconi, and P. Xiao. Skin characterizations by using contact capacitive imaging and high-resolution ultrasound imaging with machine learning algorithms. *Applied Sciences*, 11(18), sep 2021. Art. no. 8714

[3] B. Palumbo, F. Bianconi, and I. Palumbo. Solitary pulmonary nodule: Is positron emission tomography/computed tomography radiomics a valid diagnostic approach? *Lung India*, 38(5):405–407, sep-oct 2021. Editorial

[4] F. Bianconi, M.L. Fravolini, I. Palumbo, G. Pascoletti, S. Nuvoli, M. Rondini, A. Spanu, and B. Palumbo. Impact of lesion delineation and intensity quantisation on the stability of texture features from lung nodules on CT: A reproducible study. *Diagnostics*, 11(7), jul 2021. Art. no. 1224

[5] F. Bianconi, M.L. Fravolini, S. Pizzoli, I. Palumbo, M. Minestrini, M. Rondini, S. Nuvoli, A. Spanu, and B. Palumbo. Comparative evaluation of conventional and deep learning methods for semi-automated segmentation of pulmonary nodules on ct. *Quantitative Imaging in Medicine and Surgery*, 11(7):3286 − 3305, jul 2021

[6] F. Bianconi, A. Fernández, and R.E. Sánchez-Yáñez. Special issue texture and color in image analysis. *Applied Sciences*, 11(9), 2021. Art. no. 3801. Editorial

[7] B. Palumbo, F. Bianconi, S. Nuvoli, A. Spanu, and M.L. Fravolini. Artificial intelligence techniques support nuclear medicine modalities to improve the diagnosis of Parkinson's disease and Parkinsonian syndromes. *Clinical and Translational Imaging*, 9(1):19–35, feb 2021

[8] F. Bianconi and E. Brugnoli. Enumerating necklaces with transitions. *Bulletin of the Australian Mathematical Society*, 2021. In press

[9] F. Bianconi, J.N. Kather, and C.C. Reyes-Aldasoro. Experimental assessment of color deconvolution and color normalization for automated classification of histology images stained with hematoxylin and eosin. *Cancers*, 12(11), nov 2020. Art. no. 3337

[10] B. Palumbo, F. Bianconi, I. Palumbo, M.L. Fravolini, M. Minestrini, S. Nuvoli, M.L. Stazza, M. Rondini, and A. Spanu. Value of shape and texture features from 18F-FDG PET/CT to discriminate between benign and malignant solitary pulmonary nodules: An experimental evaluation. *Diagnostics*, 10, sep 2020. Art no. 696

[11] E. Chirikhina, A. Chirikhin, P. Xiao, S. Dewsbury-Ennis, and F. Bianconi. In vivo assessment of water content, trans-epidermialwater loss and thickness in human facial skin. *Applied Sciences*, 10(17), sep 2020. Art. no. 6139

[12] C. Buratti, E. Belloni, F. Merli, and F. Bianconi. Experimental characterization of the color rendering properties of transparent monolithic aerogel. *Solar Energy*, 205:183–191, jul 2020

[13] B. Palumbo, R. Capozzi, F. Bianconi, M.L. Fravolini, S. Cascianelli, S.G. Messina, G. Bellezza, A. Sidoni, F. Puma, and M. Ragusa. Classification model to estimate MIB-1 (Ki 67) proliferation index in NSCLC patients evaluated with 18F-FDG-PET/CT. *Anticancer Research*, 40(6):3355–3360, jun 2020

[14] S. Nuvoli, A. Spanu, M.L. Fravolini, F. Bianconi, S. Cascianelli, G. Madeddu, and B. Palumbo. [123I]metaiodobenzylguanidine (MIBG) cardiac scintigraphy and automated classification techniques in Parkinsonian disorders. *Molecular Imaging and Biology*, 22(3):703–710, jun 2020

[15] F. Bianconi, I. Palumbo, A. Spanu, S. Nuvoli, M.L. Fravolini, and B. Palumbo. PET/CT radiomics in lung cancer: An overview. *Applied Sciences*, 5(10), mar 2020. Art. no. 1718

[16] F. Smeraldi, F. Bianconi, A. Fernández, and E. González. Partial order rank features in colour space. *Applied Sciences*, 10(2), jan 2020. Art. no. 499

Conference proceedings

[1] F. Bianconi. Experimental analysis of colour constancy and colour augmentation for painting classification by artistic genre: preliminary results. In *Proceedings of the 2nd International Conference Florence Heri-Tech: The Future of Heritage Science and Technologies, HERITECH 2020*, volume 949 of *IOP Conference Series: Materials Science and Engineering*, Florence, Italy, oct 2020. Art. no. 012065

[2] F. Bianconi, M.L. Fravolini, I. Palumbo, and B. Palumbo. Shape and texture analysis of radiomic data for computer-assisted diagnosis and prognostication: an overview. In C. Rizzi, A.O. Andrisano, F. Leali, F. Gherardini, F. Pini, and A. Vergnano, editors, *Proceedings of the International Conference on Design Tools and Methods in Industrial Engineering (ADM)*, Lecture Notes in Mechanical Engineering, pages 3–14, Modena, Italy, sep 2019. Springer