

Curriculum Vitae

Ricardo Bettencourt da Silva

1. Personal Data

Name	Ricardo Jorge Neves Bettencourt da Silva
Birthdate	12th August 1971
Nationality	Portuguese
Email	rjsilva@fc.ul.pt
Website	http://webpages.fc.ul.pt/~rjsilva (http://mechem.rd.ciencias.ulisboa.pt/)
Researcher ID	E-1807-2012
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2. Education

Degree (3)	PhD in Analytical Chemistry
Institution	Faculty of Sciences of the University of Lisbon
Conclusion	19 November 2004
Supervisors	Prof. Dr. Maria Filomena G. F. C. Camões and Principal Researcher Júlia Ribeiro dos Santos
Thesis	Modelling the performance of complex analytical methods
Description	<i>Development of new approaches for the detailed evaluation of the uncertainty of complex measurements. First PhD in Metrology in Chemistry in Portugal. First detailed evaluation of the uncertainty of measurements of pesticide residues in foodstuffs.</i>
Mark	Maximum score
Degree (2)	Master in Food Quality Control and Toxicology
Institution	Faculty of Pharmacy of the University of Lisbon
Conclusion	5 March 1998
Supervisors	Prof. Dr. Maria Filomena G. F. C. Camões and Principal Researcher João Seabra e Barros
Thesis	Validation of the determination of metals in solid foodstuffs
Description	<i>Development, validation and detailed modelling of the uncertainty of measurements of metals in solid foodstuffs by atomic spectroscopy.</i>
Mark	Maximum score (thesis); 15 points (courses)
Degree (1)	Graduation in Chemistry
Institution	Faculty of Sciences of the University of Lisbon
Conclusion	21 December 1993
Supervisors	Prof. Dr. Maria Filomena G. F. C. Camões
Thesis	Part I: Flow injection analysis with potentiometric detection Part II: Capillary electrophoresis (co-supervised by Dr Henk Lauer; Lauerlabs, Emmen, NL)
Description	<i>Development and validation of a procedure for the measurement of silver ion in aqueous solutions by flow injection analysis with potentiometric detection. Development and validation of a procedure for the measurement of the ionic composition of drinking water by capillary electrophoresis with UV/Vis spectrometry detection. Development of a flow cell for buffer regeneration or change in capillary electrophoresis.</i>
Mark	14 points

3. Professional experience

3.1. Main activity

Position (16)	Researcher
Institution	Faculty of Sciences of the University of Lisbon
Date	1 July 2019 – (...)
Description	<i>Researcher in Examinology and Metrology in Chemistry. Examinology and metrology are the sciences of qualitative and quantitative determinations in chemistry, respectively.</i>

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Position (15)	Researcher
Institution	Environmental Biogeochemistry Group - Centro de Química Estrutural
Date	1 January 2016 – (...)
Description	<i>Researcher in Examining and Metrology in Chemistry.</i>

Position (14)	Invited Professor
Institution	Chemistry and Biochemistry Department – Faculty of Sciences of the University of Lisbon
Date	25 May 2015 – (...)
Description	<i>Invited chemistry Professor.</i>

Position (13)	Invited scientist of a financed project
Institution	Environmental Biogeochemistry Group - Centro de Química Estrutural (CQE) Analytical and Environmental Chemistry Group - Centre for Molecular Sciences and Materials (CCMM)
Date	23 November 2014 – 23 May 2015
Description	<i>Invited scientist of the FCT project EXPL/QEQ-QAN/0458/2013.</i>

Position (12)	Researcher and Assessor for the Accreditation of Laboratories
Institution	Independent contractor
Date	16 June 2014 – 23 November 2014
Description	<i>Independent contractor for research in Metrology and Examining in chemistry, and for assessing the performance of accredited laboratories, following the ISO/IEC 17025 standard, for chemical tests.</i>

Position (11)	Researcher
Institution	Analytical and Environmental Chemistry Group - Centre for Molecular Sciences and Materials (CCMM)
Date	15 June 2009 – 15 June 2014
Description	<i>Contracted, by “FCT-Ciência 2008” programme, for developing research in Analytical Chemistry and Metrology in Chemistry.</i>

Position (10)	Invited Researcher to Technical Head of Laboratory
Institution	Pesticide Residues Laboratory – Institute for Biological Resources (Public service and official laboratory for the monitoring of pesticide residues in foodstuffs; Accredited by the National Accreditation Body)
Date	15 December 2008 – 15 June 2009
Description	<i>Researcher and analyst for the measurement of pesticide residues in foodstuffs. Technical head of the laboratory in the last month.</i>

Position (9)	Consultant, Trainer and Assessor for the Accreditation of Laboratories
Institution	Independent contractor
Date	1 October – 14 December 2008
Description	<i>Independent contractor for consulting, training and assessing the performance of accredited laboratories, following the ISO/IEC 17025 standard, for chemical tests.</i>

Position (8)	Researcher
Institution	Centre of Chemistry of Vila Real of the University of Trás-os-Montes and Alto Douro (UTAD)
Date	3 March 2008 – 30 September 2008
Description	<i>Contracted, by the “FCT-Ciência 2007” programme, for studying the photodegradation of organic compounds in ionizing radiation. The kinetics of parabens degradation by the radiation of low-pressure mercury lamps was studied after measuring lamp emission by actinometry.</i>

Position (7)	Analyst
Institution	Pesticide Residues Laboratory – General-Directorate of Crop Protection (DGPC) (Public service and official laboratory for the monitoring of pesticide residues in foodstuffs; Accredited by the National Accreditation Body)
Date	26 May 1999 – 29 February 2008
Description	<i>Measurement of pesticide residues in foodstuffs using multi-analyte and multi-matrix chromatographic methods (GC-μECD, GC-TOF-MS, GC-ITD-MS, HPLC-UV, GC-NPD and GC-FPD). Development and validation of the measurement procedures including the evaluation of the measurement uncertainty, development of strategies for tests quality control, development of software with automatic links with signals from instrumentation for routine analysis quality control, elaboration of technical procedures for the accreditation, development of LIMS platform, etc. The developed software is being used in the official</i>

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monitoring since 2002. A new approach for the detailed evaluation of the uncertainty of pesticide residues measurements in foodstuffs was developed. Accreditation of the qualitative and quantitative analysis of 70 pesticide residues in foodstuffs of vegetable origin, in 25 minutes long runs, by GC-TOF-MS.

Position (6) Head of the Quality Assurance System

Institution Division for drinking water treatment and analysis – Municipal Services of Loures (Public Municipal Service)
Date 26 April – 25 May 1999
Description *Elaborated a plan for the accreditation of the drinking water analysis laboratory.*

Position (5) Analyst to Substitute of the Technical Head and Director of Laboratory

Institution Controlab, Lda – Laboratory for Chemical, Physical and Biological Analysis (Private service laboratory and Training in Analytical Chemistry; Accredited by the National Accreditation Body)
Date 2 September 1996 to 25 April 1999
Description *Elemental analysis of environmental samples, medicines, foodstuffs, etc. by atomic spectroscopy (AES-ICP, FAAS, FAES, CVAAS, HGAAS and ETAAS). Development and validation of the analytical methods including the evaluation of the measurement uncertainty, development of strategies for tests quality control and routine analysis. Substituted the Technical Head for four months and the Laboratory Director for three weeks in 1998.*

Position (4) Trainee (short-term activity)

Institution Regional Center for Agropharmaceutical Research of Anger (CREPA), France
Date 1-12 July 1996 and 15 September-9 October 1997
Description *Measurements of pesticide residues in waters by capillary electrophoresis with the supervision of Prof. Dr Josette Fournier and Prof. Dr Maria Filomena G. F. C. Camões. Work financed by a protocol between JNICT (National Body for the Promotion of Research and Technology) and the French embassy in Portugal.*

Position (3) Trainee to Analyst

Institution Laboratory for Environmental and Quality Control Analysis (LAACQ) of the Institute for Engineering and Industrial Technology (INETI) (Public service and research laboratory; Accredited by the National Accreditation Body)
Date 20 July 1994 – 30 June 1996
Description *Inorganic analysis of complex items (soils, minerals, alloys, foodstuffs, wastewaters, etc.) by atomic spectroscopy (FAAS, FAES, CVAAS and HGAAS) and classical methods of analysis. Development and validation of the measurement procedures including the evaluation of the measurement uncertainty, control charts implementation and routine analysis. Trainee activity financed by “9º Programa de Jovens Técnicos para a Indústria”. Contracted, as analyst, for the last five months.*

Position (2) Trainee

Institution Lauerlabs B.V., Emmen, The Netherlands (Producer of capillary electrophoresis instrumentation)
Date 8 August 1993 – 31 January 1994
Description *Development of the second part of the graduation project in the laboratory for analytical applications and instrumentation development. Work financed by ACTIVE programme (Analytical Chemistry Turntable for Industry Visits and Education).*

Position (1) Trainee

Institution Centre of Electrochemistry and Kinetics of the University of Lisbon (CECUL)
Date September 1993 – August 1993
Description *Development of the first part of the graduation project. Work financed by PRODEP (Programme for the Educational Development of Portugal).*

3.2. Other activities

Role (16) Co-coordinator of ForMEQ

Institution Fórum Internacional para a Metrologia e Examinologia em Química (ForMEQ) (formeq.org)
Date March 2019 – (...).
Description *Co-coordinator of ForMEQ*

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Role (15)	Secretary of CITAC
Institution	Cooperation on International Traceability in Analytical Chemistry (CITAC) (www.citac.cc)
Date	April 2017 – (...).
Description	<i>Executive Secretary of CITAC</i>

Role (14)	Member of the ‘Centro de Química Estrutural’ (CQE)
Institution	Centro de Química Estrutural
Date	January 2015 – (...).
Description	<i>Member of the Environmental Biogeochemistry Group - Centro de Química Estrutural.</i>

Role (13)	Member of the Subcommittee on Metrology in Chemistry of the IUPAC Analytical Chemistry Division
Institution	International Union of Pure and Applied Chemistry
Date	July 2019– (...).
Description	<i>Member of the working group.</i>

Role (12)	Member of the Study Group ‘Quality Assurance’ of EuCheMS
Institution	European Association for Chemical and Molecular Sciences (EuCheMS)
Date	November 2016 – (...).
Description	<i>Member of the Study Group ‘Quality Assurance’ of the .Division of Analytical Chemistry of EuCheMS.</i>

Role (11)	Member of the working group ‘Eurachem-Portugal: Metrologia Química’/ ‘GT5: Química; Comissão Técnica RELACRE 04: Metrologia’
Institution	RELACRE – Associação de Laboratórios Acreditados de Portugal
Date	July 2014 – (...).
Description	<i>Working group member.</i>

Role (10)	Member of the Centre for Molecular Sciences and Materials (CCMM)
Institution	Centre for Molecular Sciences and Materials
Date	June 2007 – December 2014.
Description	<i>Member of the Analytical and Environmental Chemistry Group. Member of the Executive Commission of CCMM between March 2012 and December 2014.</i>

Role (9)	Referee of Scientific Journals and Research Projects
Institution	Various
Date	2004 – (...).
Description	Scientific Journals <i>Analytica Chimica Acta, Elsevier: 56 manuscripts;</i> <i>Analytical letter, Taylor & Francis: 6 manuscripts;</i> <i>Analytical Methods, RSC: 3 manuscripts;</i> <i>Environmental Engineering and Management Journal (Romania): One manuscript;</i> <i>Food Chemistry, Elsevier: 8 manuscripts;</i> <i>International Journal of Environmental Analytical Chemistry, Taylor & Francis: 2 manuscripts;</i> <i>Journal Accreditation and Quality Assurance, Springer: 54 manuscripts;</i> <i>Journal of Chromatography A: One manuscript;</i> <i>Journal of the Association of Official Analytical Chemists: 8 manuscripts;</i> <i>Journal of the Science of Food and Agriculture: One manuscript;</i> <i>Measurement, Elsevier: 7 manuscripts;</i> <i>Talanta - The International Journal of Pure and Applied Analytical Chemistry, Elsevier: 31 manuscripts;</i> <i>Water, MDPI: 2 manuscripts.</i> <i>Water, Air, & Soil Pollution, Springer: One manuscript</i>
	Research Projects <i>EMPIR - European Metrology Programme for Innovation and Research: 2020</i> <i>IUPAC project on Metrology in Chemistry: June 2011;</i>

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Role (8)	Authorized TrainMiC® trainer and member of the Editorial Board
Institution	Institute for Reference Materials and Measurements (IRMM)
Date	18 September 2007 – (...).
Description	<i>Authorised trainer of this European programme for lifelong learning on metrology in chemistry (www.trainmic.org) since 18 September 2007. Member of the TrainMiC Editorial Board since 2 February 2010. Responsible for the elaboration of the second edition of the TrainMiC module: “Uncertainty of Measurement Principles” (translated to 14 languages).</i>
Role (7)	Member of Eurachem
Institution	Eurachem (Network of organisations in Europe having the objective of establishing a system for the international traceability of chemical measurements and the promotion of good quality practices)
Date	(1) August 2000 – March 2007; (2) May 2010 – (...)
Description	(1) <i>Secretariat support of the Eurachem Vice-Chair and Chair, Prof. M. Filomena Camões [August 2000-July 2004]. Eurachem webmaster [March 2002 – March 2007]</i> (2) <i>National Representative since 28 May 2010 Member of the Measurement Uncertainty and Traceability Working Group Since 26 May 2010 » Editor of the following guide: R. Bettencourt da Silva, A. Williams (eds.), Eurachem/CITAC Guide: Setting and Using Target Uncertainty in Chemical Measurement, Eurachem 2015. Member of the Executive Committee since 24 May 2012 Member of the Qualitative Analysis Working Group Since December 2012 » Elected Chair of the working group since May 2017 (Re-elected May 2019)</i>
Role (6)	Member of Eurachem-Portugal
Institution	Eurachem-Portugal (Secretariat by RELACRE, Portuguese Association of Accredited Laboratories)
Date	June 2006 – (...)
Description	<i>Eurachem-Portugal aims at providing guidance for laboratories on the production of reliable analytical data. Member of Working Group I for the evaluation of measurement uncertainty. Webmaster of Eurachem-Portugal since August 2000 (www.eurachem.fc.ul.pt).</i>
Role (5)	Technical Assessor for the Accreditation of Chemical Tests
Institution	Portuguese Accreditation Body (Instituto Português de Acreditação, IPAC)
Date	May 2002 – (...)
Description	<i>Technical assessor for the accreditation of tests following the ISO/IEC 17025 standard. Assessment of laboratories for the analysis of inorganic and organic analytes in waters, foodstuffs, raw materials, products and residues of the industry, etc. Performed 188 audits from which 7 were first assessments. Auditing performance was praised by inspectors of the “European co-operation for Accreditation” in a Peer-evaluation of IPAC performed in 2004.</i>
Role (4)	Member of a Working Group for the Accreditation of Laboratories (03/WG/03/CHEM)
Institution	Portuguese Accreditation Body (Instituto Português de Acreditação, IPAC)
Date	April 2004 – (...).
Description	<i>The working group developed guidance of IPAC for the evaluation of the uncertainty of measurements in chemistry (Guide OGC007) and revised criteria for the assessment of other technical requirements of the ISO/IEC 17025 standard (Guide OGC002).</i>
Role (3)	Consultant for Testing Laboratories and Research Units
Institution	Independent contractor
Date	May 2002 – February 2008
Description	<i>Consultant for the accreditation of testing laboratories, following ISO/IEC 17025 standard, and for the application of OCDE Principles of Good Laboratory Practice (GLP) in research units. Performed 16 internal audits of testing laboratories and 11 GLP inspections. Developed the following projects: Project 1: Pharmaceutical Studies Laboratory (LEF)(National Association of Pharmacies) [2002-2003] Consultancy on accreditation and GLP; Project 2: SAPEC-Agro (Pesticide Production Industry) [2003-2004] – Elaboration of technical documents, and preparation and participation in the first external GLP inspection; Project 3: Infarmed (National Authority of Medicines and Health Products, IP) – Consultancy for the accreditation of the “Laboratory of Pharmaceutical Chemistry” (LQF) [December 2004 – September</i>

2006];

Project 4: *Infarmed – Consultancy for the accreditation of the “Laboratory of Pharmacopeia and Biopharmacy” (LQFTB) and the “Laboratory of Biology and Biotechnology” (LBIO) [July 2006 – March 2008];*

Project 5: *DRARN (Regional Directorate for Environment and Natural Resources of Madeira)[June 2007-February 2008] – Consultancy for the accreditation of the Regional Pesticide Residues Laboratory.*

Project 6: *RELACRE (Association of Accredited Laboratories) - Statistical treatment of results of a proficiency test on the analysis of textiles [September 2007].*

Role (2) Member of the Scientific Council of DGPC

Institution General-Directorate of Crop Protection (DGPC)
Date December 2004 – March 2008
Description *Member of the Scientific Consulting Body of DGPC.*

Role (1) Expert of an Inspection of the Food and Veterinary Office

Institution Food and Veterinary Office (FVO) of the European Commission
Date 11-15 September 2006 (Romania)
Description *FVO Mission 8120/2006 for the Control of Pesticides in Products of Vegetable origin in Romania. Participation in the mission for the assessment of laboratories involved in the monitoring of pesticide residues in foodstuffs and in the monitoring of pesticide formulations.*

4. Financed R&D projects

Project (9) UnipHied - Realisation of a Unified pH Scale (EURAMET 17FUN09)

Beneficiaries Government Office of the Capital City Budapest (BFKH)
 Czech Metrology Institute (CMI)
 Danish Fundamental Metrology (DFM)
 Instituto Português da Qualidade (IPQ)
 Laboratoire National de Métrologie et D’Essai (LNE)
 Finnish Environment Institute (MIKES-SYKE)
 Physikalisch-Technische Bundesanstalt (PTB)
 Ulusal Metroloji Enstitüsü (UME)
 Albert-Ludwigs-Universität Freiburg (Germany)
 ANB Sensors Limited (United Kingdom)
 FCIências.ID - Associação para a Investigação e Desenvolvimento de Ciências (Portugal)
 Tartu Ülikool (Estonia)

Financing EURAMET
Date Started 2018

Description *pH is one of the most important chemical properties measured in both science and industry, playing a vital role in health, environmental studies, and material reprocessing. With potential to impact an extensive range of sectors, accurate analysis and monitoring of pH is essential. Due to theoretical and practical constraints, the comparison of pH between different media hasn’t been possible and over the last century this has led to the formation of several incompatible pH scales. In 2010 the concept of a unified acidity scale, pHabs, was devised to overcome this issue, but it has proved challenging to implement. This project will put pHabs into practice by establishing a reliable and universally applicable procedure for measuring the acidity of any substance. It will also develop a validated set of calibration standards for a wide variety of media. In striving towards a practical and accurate unified pH scale, this project will support and strengthen EU manufacturing and innovation in industries from pharmaceuticals to petrochemicals and semiconductors.*

Project (8) IUPAC/CITAC Guide for evaluation of risks of conformity assessment of a multicomponent material or object due to measurement uncertainty (IUPAC 2018-004-1-500)

Beneficiaries Independent Consultant on Metrology, Ilya Kuselman
 Istituto Nazionale di Ricerca Metrologica, Italy
 School of Chemistry, Australia
 Faculty of Sciences of the University of Lisbon

Financing International Union of Pure and Applied Chemistry
Date Started July 2018

Description *To develop a joint IUPAC/CITAC guide for classification and quantification of risks of false decisions on conformity of a multicomponent material or object to specification or regulation limits of its chemical composition, due to measurement uncertainty.*

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The guide will be helpful for improvement of understanding of consequences of measurement uncertainty and correct choice of methods for testing chemical composition of multicomponent materials and objects. The opportunity to work with CITAC and prepare a joint guide (as an IUPAC TR), will give the widest possible exposure to our work and justifies, in our opinion, the requested extension.

Project (7)	AQUIMar – Caracterização geral das áreas aquícolas para estabelecimento de culturas marinhas
Beneficiaries	Instituto Hidrográfico Faculty of Sciences of the University of Lisbon Centro de Ciências do Mar e do Ambiente Instituto Politécnico de Leira Centro de Química Estrutural – Faculdade de Ciências da Universidade de Lisboa
Financing Date	Mar2020 2018 - 2021
Description	<i>Assessment of the feasibility of establishing new aquaculture units in Portugal.</i>
Project (6)	Risks of conformity assessment of a multicomponent material or object in relation to measurement uncertainty of its test results (IUPAC 2016-007-1-500)
Beneficiaries	Independent Consultant on Metrology, Ilya Kuselman Istituto Nazionale di Ricerca Metrologica, Italy School of Chemistry, Australia Faculty of Sciences of the University of Lisbon
Financing Date	International Union of Pure and Applied Chemistry 2016 – 2017
Description	<i>Development of an approach for evaluation of the probability of false decisions in conformity assessment of a multicomponent material or object in relation to measurement uncertainty of chemical analysis results of a sample of the material or object. This probability, combining probabilities of false decisions concerning different components of the material or object, will characterize the sample conformity as a whole. The solution to this problem is important for understanding conformity assessment risks in food control, environmental control, customs control, clinical analysis, medicines control and other fields. Risks were estimated for cases where the concentration of components in the analysed sample are independent or correlated. Calculations were performed in R-ambient and using a user-friendly MS-Excel spreadsheets to allow the easy application of the developed tools.</i>
Project (5)	Development of a computational tool for the identification of pesticides in foodstuffs by mass spectrometry (EXPL/QEQ-QAN/0458/2013)
Beneficiaries	Faculty of Sciences of the University of Lisbon Principal Investigator: Ricardo J. N. Bettencourt da Silva
Financing Date	Foundation for Science and Technology (FCT) 2014 – 2015.
Description	<i>Development of a computational tool to define statistically sound criteria for the identification/examination of trace levels of pesticide residues in foodstuffs by LC-MS and GC-MS based on Monte Carlo simulations of ratios of characteristic and correlated signals. This tool is also used to estimate the uncertainty of the performed identifications/examinations. The definition of statistically sound criteria for relative retention times, RRT, and ratios of the abundance of ions, RA, of the mass spectrum of the analyte must be able to assess the not-normal distribution of these ratios. A user-friendly MS-Excel spreadsheet, based on Monte Carlo simulations of ratios of highly correlated variables, was developed to define criteria for the variation of RRT and RA. The selected confidence level of the confidence intervals defines the true positive results rate, TP. Another MS-Excel file was developed to simulate the signal noise of the analytical instrument and quantify the probability of the noise producing false positive results, i.e. the false positive results rate, FP. The identification/examination uncertainty was estimated by the Likelihood ratio, LR (LR=TP/FP), of the Bayes Theorem that estimates how more likely a positive result is true than false. Models of the variation of the LR with the level of analyte were developed to estimate the Limit of Examination; the lowest analyte level that can be identified in a conclusive way - i.e. with a LR not smaller than 10⁶. These tools were successfully applied to the identification of trace levels of pesticide residues in foodstuffs.</i>

Project (4) Metrology for ocean salinity and acidity (ENV05 OCEAN)	
Beneficiaries	National Metrology Institute of Germany (PTB) National Institute for Metrological Research of Italy (INRiM) Portuguese Institute for Quality (IPQ) Institute for Reference Materials and Measurements of the European Commission (IRMM) French National Laboratory for Metrology and Testing (LNE) Finnish Environment Institute (SYKE) Hungarian Trade Licensing Office of Hungary (MKEH) National Physical Laboratory of the United Kingdom (NPL) Slovak Institute of Metrology (SMU) University of Tartu (UT) University of Plymouth (UP) Faculty of Sciences of the University of Lisbon
Financing Date	European Metrology Programme for Innovation and Research (EMPIR) 2011 – 2014.
Description	<i>The project aimed at developing the metrological traceability to the SI system of measurements of the key variables salinity, pH, composition, and dissolved oxygen content of seawater which is mandatory to enable a common international basis for comparisons of long-term and widespread data in ocean observation.</i>
Project (3) ArsonCPU – Development of computational tools for arson detection with quantified reliability (PTDC/QUI-QUI/103566/2008)	
Beneficiaries	Faculty of Sciences of the University of Lisbon Portuguese Criminal Police (PJ) Faculty of Sciences and Technology of the New University of Lisbon Institute for Biological Resources
Financing Date	Foundation for Science and Technology (FCT) 2009 – 2012
Description	<i>Development of a computational tool for the reliable identification/examination of the use of accelerants in arson, including the estimation of identification/examination uncertainty.</i>
Project (2) METROPEST – Metrological Quality of the Analysis of Pesticide Residues in Foodstuffs of Vegetable origin (POTCI/ACR/47587/2002)	
Beneficiaries	General-Directorate for Crop Protection Faculty of Sciences of the University of Lisbon
Financing Date	Foundation for Science and Technology (FCT) 2003 - 2006
Description	<i>Development of a strategy for the international comparability of measurements of pesticide residues in foodstuffs of vegetable origin.</i> <i>This project involved defining strategies for the selection of representative matrices and analytes to simplify the validation of analytical methods and the quality control of analysis performed using multi-matrix and multi-analyte methods of analysis. This selection was based on the equivalence of the multivariate pattern of nutritional parameters of foodstuffs or physicochemical properties of analytes.</i> <i>It was also developed tools to estimate and correct relevant analyte losses in the analytical method to allow the comparability of measurements produced from sample treatments with different efficiency; i.e. associated with different analyte recovery.</i>
Project (1) Development of a quality assurance program for chemical tests based on the measurement uncertainty	
Beneficiary	Controlab, Lda – Laboratory for Chemical, Physical and Biological Analysis
Financing	Agency for Innovation S.A. (Agência da Inovação) Programme “Doutorados e Mestres para as Empresas”
Date	1999
Description	<i>Development of a quality assurance program for chemical tests based on analytical methods validation and routine analysis quality control supported by detailed measurement uncertainty evaluations.</i> <i>This innovative project aimed at evaluating the uncertainty of routine analysis results obtained at Controlab, Lda, to report that information to clients and use it in tests quality control.</i>

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5. Scholarships

Scholarship (6)	PostDoc scholarship (SFRH/BPD/110186/2015)
Financing	Foundation for Science and Technology (FCT)
Date	1 January 2016 (Start)
Description	<i>Title of the working programme: 'Objectivity and comparability of environmental measurements'.</i>
Scholarship (5)	PhD scholarship (SFRH/BD/10903/2002)
Financing	Foundation for Science and Technology (FCT)
Date	Attributed in 2002
Description	<i>The scholarship was not accepted by the candidate since he had previously signed a work contract with DGPC.</i>
Scholarship (4)	Master scholarship - PRAXIS XXI (BM 6508/95)
Financing	JNICT (National Body for the Promotion of Research and Technology)
Date	1 February 1996 – 31 January 1998
Description	<i>Scholarship for completing the MSc.</i>
Scholarship (3)	9º Programa de Jovens Técnicos para a Indústria
Financing	<i>National Institute for Engineering and Technology</i>
Date	20 July 1994 – 31 January 1996
Description	<i>Analytical work in the National Institute for Engineering and Technology (INETI)</i>
Scholarship (2)	ACTIVE (Analytical Chemistry Turntable for Industry Visits and Education)
Financing	European Union and Portuguese Government
Date	8 August 1993 – 31 January 1994
Description	<i>Second part of the graduation thesis performed at Lauerlabs B.V., The Netherlands</i>
Scholarship (1)	PRODEP (Programme for the Educational Development of Portugal)
Financing	European Union and Portuguese Government
Date	September 1992 – August 1993
Description	<i>First part of the graduation thesis performed at CECUL.</i>

6. Technical Collaboration in Projects and Reports

- (16) *Pesticide residue monitoring in foodstuffs of vegetable origin – 2005 – Portugal, DGPC-DSPF, PPA(LRP) - 02/07, DGPC, Oeiras, 2007.*
- (15) *Pesticide residue monitoring in foodstuffs of vegetable origin – 2004 – Portugal, Ed. DGPC, DGPC, Oeiras, 2005.*
- (14) *Pesticide residue monitoring in foodstuffs of vegetable origin – 2003 – Portugal, DGPC-DSPF, PPA(LRP) - 02/04, DGPC, Oeiras, 2004.*
- (13) *Pesticide residue monitoring in foodstuffs of vegetable origin – 2002 – Portugal, DGPC-DSPF, PPA(LRP) - 01/03, DGPC, Oeiras, 2003.*
- (12) *Pesticide residue monitoring in foodstuffs of vegetable origin – 2001 – Portugal, DGPC-DSPF, PPA(LRP) - 01/02, DGPC, Oeiras, 2002.*
- (11) *Pesticide residue monitoring in foodstuffs of vegetable origin – 2000 – Portugal, DGPC-DSPF, PPA(FR) - 04R/01, DGPC, Oeiras, 2001.*
- (10) *Pesticide residue monitoring in foodstuffs of vegetable origin – 1999 – Portugal, DGPC-DSPF, PPA(FR) - 03R/00, DGPC, Oeiras, 2000.*
- (9) European Commission, *Intercomparison Study of Two Multi-Residue Methods for the Enforcement of EU MRLs for Pesticides in Fruit, Vegetables and Grain. Phase IV: Intercomparison Study of Test Materials Containing Incurred Residues*, Report EUR 19443 EN, 2001.
- (8) European Commission, *Intercomparison Study of Two Multi-Residue Methods for the Enforcement of EU MRLs for Pesticides in Fruit, Vegetables and Grain. Phase III: Intercomparison Study of Test Materials Containing Incurred Residues*, Report EUR 19306 EN, 2000.
- (7) *Pesticide Residue Monitoring in Fruit, Vegetables and Cereals in Portugal 1999*, DSPF, PPA(FR) - 03R/00, DGPC, Oeiras, 2000.
- (6) Euromet Project “*Traceability of pH measurements*”, Physicalish Technische Bundesanstalt, 1996: one month of collaboration with CECUL research team.

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(5) *Caracterização de Solos, Resíduos e Águas Subterrâneas - Companhia Industrial de Resinas Sintéticas - Cires, S. A., ITA N° 19/96, 1996.*

(4) *Terras Provenientes da Calcinação de Lamas Residuais do Tanque OP-T8 (Crude), Relatório/LAACQ 05/96, 1996.*

(3) *Lamas de ETAR da Instalação de Anodização e Lacagem - Estabelecimentos Manuel Ferreira, Lda. - Alumínios, Relatório/LAACQ 04/96, 1996.*

(2) *Lamas Provenientes da Refinação de Açúcar Alcântara - Refinarias de Açúcar, S.A., Relatório/LAACQ 03/96, 1996.*

(1) *Lamas Desidratadas da Resiquímica, Relatório/LAACQ 02/96, 1996.*

7. Complementary Education

(26) *Iniciação à plataforma Moodle, E-Learning Lab, University of Lisbon, Lisbon, 21 and 27 September 2010.*

(25) *Sensibilização em Comunicação Comportamental em Auditorias, IPAC, Caparica, 20 October 2007.*

(24) *3rd TrainMiC Training New Trainers Event, Maribor, Slovenia, 17 e 18 September 2007.*

(23) *National Experts Training on Pesticide Residues, FVO - European Commission, Grange, Irlanda, 13 and 14 March 2007.*

(22) *Metodologias de Auditoria de Acreditação de Laboratórios – ISO/IEC 17025, IPAC, Caparica, 9 January 2006.*

(21) *Equipamentos de segurança e procedimentos de emergência, DGPC, Oeiras, 24 May 2005.*

(20) *Redução do risco no uso de produtos fitofarmacêuticos, DGPC, Oeiras, 4 May 2005.*

(19) *Laboratory Information Management System (LIMS), Nautilus 2002 R1 – Instrument Integration Training Course, ThermoLabsystems, Oeiras, 13-16 December 2004.*

(18) *Liderança e Gestão de Equipas, DGPC, Oeiras, 17 November 2004.*

(17) *Gestão de Fornecedores em Laboratório, DGPC, Oeiras, 17 November 2004.*

(16) *Princípios de Boas Práticas de Laboratório da OCDE, Laboratório de Estudos Farmacêuticos, Algés, 24 November 2003.*

(15) *Laboratory Information Management System (LIMS), Nautilus 2002 R1 and Infomaker 8.0, ThermoLabsystems, Oeiras, 23-27 September 2002.*

(14) *Application of Ultrasonics in Food Analysis, Central Science Laboratory, York, United Kingdom, 6 June 2001.*

(13) *Ação de Sensibilização em Auditorias a Laboratórios para Auditores Técnicos, RELACRE, Lisbon, 2 May 2001.*

(12) *Enquadramento da Área da Protecção das Culturas no III Quadro Comunitário de Apoio, DGPC, Lisbon, 26 October 2000.*

(11) *A Europa e a Segurança Alimentar, Presidência Portuguesa da União Europeia, Lisbon, 19 April 2000.*

(10) *Metrologia Aplicada, IBET, Oeiras, 6 April 2000.*

(9) *Cromatografia em Fase Gasosa, Controlab Lda., Póvoa de Santa Iria, 16-18 July 1997.*

(8) *Microbiologia Alimentar, Prof. Dr. Edmund Zootola (Minnesota University), Faculty of Pharmacy of the University of Lisbon, Lisbon, 11-15 November de 1996.*

(7) *Cromatografia Iónica, Centro de Formação de Dias de Sousa Lda., Póvoa de Santa Iria, 25 October 1996.*

(6) *Regressão Linear e Incerteza de Curvas de Calibração, ITA - LAACQ, Lisbon, 13 November 1995.*

(5) *Sistemas de Incentivos às Empresas, INETI, Lisbon, 7 July 1994.*

(4) *Qualidade, Higiene e Segurança, INETI, Lisbon, 6 July 1994.*

(3) *MS/DOS, Windows, Word para Windows e Excel para Windows (1 week), Associação Industrial Portuguesa (AIP-COPRAI), Lisbon, 1994.*

(2) *Capillary Electrophoresis - Theory and Applications, Hospital S. João do Porto, Oporto, 12-14 April 1994.*

(1) *Dia dos Glúcidos, Faculty of Sciences of the University of Lisbon, Lisbon, 7 May 1993.*

8. Teaching Experience

8.1. Professional Schools

School **Escola Profissional da Indústria Química**

Course (year) (1) *Métodos Instrumentais de Análise, 3rd year (1994/95)*
(2) *Química Analítica, 1st year (1994/95)*

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Ricardo Bettencourt da Silva

8.2. Universities

8.2.1. Courses and lectures

Faculty (15)	Faculty of Sciences of the University of Lisbon
Description	Various graduations and masters courses
Course (year/date)	Master in Chemistry and/or Technological Chemistry: <i>Academic year 2009/10 (1st Semester):</i> (1) <i>Metrologia Química (Lectures and exercises): 25 h;</i> (2) <i>Qualidade em Análise Química (Lectures and exercises): 17.5 h;</i> <i>Academic year 2010/11 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 17.5 h;</i> (2) <i>Redes Neurais e Quimiometria (Lectures and Computational exercises): 7.5 h;</i> (3) <i>Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atómica): 3.5 h;</i> <i>Academic year 2011/12 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 31.5 h (Course responsible; Lectures both in English and in Portuguese);</i> <i>Academic year 2011/12 (2nd Semester):</i> (1) <i>Química do Meio Aquático (Lectures and laboratory practical): 5 h;</i> <i>Academic year 2012/13 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 31.5 h;</i> (2) <i>Redes Neurais e Quimiometria (Lectures and Computational exercises): 7.0 h;</i> <i>Academic year 2012/13 (2nd Semester):</i> (1) <i>Química do Meio Aquático (Lectures): 2 h;</i> <i>Academic year 2013/14 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 35 h (Lectures both in English and in Portuguese)</i> (2) <i>Redes Neurais e Quimiometria (Lectures and Computational exercises): 14 h;</i> <i>Academic year 2013/14 (2nd Semester):</i> (1) <i>Química do Meio Aquático (Lectures): 2 h;</i> <i>Academic year 2014/15 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 35 h;</i> (2) <i>Redes Neurais e Quimiometria (Lectures and Computational exercises): 14 h;</i> <i>Academic year 2014/15 (2nd Semester):</i> (1) <i>Química do Meio Aquático (Lectures): 2 h;</i> <i>Academic year 2015/16 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 30 h;</i> (2) <i>Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atómica): 3.5 h;</i> <i>Academic year 2015/16 (2nd Semester):</i> (1) <i>Química do Meio Aquático (Lectures): 2 h;</i> <i>Academic year 2016/17 (1st Semester):</i> (1) <i>Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atómica): 3.5 h;</i> <i>Academic year 2016/17 (2nd Semester):</i> (1) <i>Análise Química Forense (Lectures and Computational exercises): 7 h;</i> (2) <i>Química do Meio Aquático (Lectures): 3 h;</i> <i>Academic year 2017/18 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 30 h;</i> (2) <i>Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atómica): 3.5 h;</i> <i>Academic year 2017/18 (2nd Semester):</i> (1) <i>Análise Química Forense (Lectures and Computational exercises): 10.5 h;</i> (2) <i>Metrologia e Examinologia em Química (Lectures, laboratory practicals and exercises): 40 h (Course responsible);</i> <i>Academic year 2018/19 (1st Semester):</i> (1) <i>Qualidade em Análise Química (Lectures and exercises): 30 h;</i> (2) <i>Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atómica): 7 h;</i> <i>Academic year 2018/19 (2nd Semester):</i> (1) <i>Análise Química Forense (Lectures and Computational exercises): 10.5 h;</i>

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Academic year 2019/20 (1st Semester):

- (1) *Qualidade em Análise Química (Lectures and exercises): 30 h;*
- (2) *Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atômica): 7 h;*
- (3) *Análise Química Ambiental: Planned: 10.5 h;*

Academic year 2019/20 (2nd Semester):

- (1) *Análise Química Forense (Lectures and Computational exercises): 10.5 h;*
- (2) *Metrologia e Examinologia em Química (Lectures, laboratory practicals and exercises): 40 h (Course responsible);*

Academic year 2020/21 (1st Semester):

- (1) *Qualidade em Análise Química (Lectures and exercises): 30 h;*
- (2) *Métodos Avançados de Análise (Lecture and laboratory practical: Espectroscopia Atômica): 7 h;*
- (3) *Análise Química Ambiental: 7 h;*

Master in “Modelação Molecular; Mestrado em Química Inorgânica Biomédica - Aplicações em Diagnóstico e Terapia”:

Academic year 2009/10 (2nd Semester):

- (1) *Avaliação da Incerteza da Medição (Lectures): 5 h;*

Graduation in Chemistry and/or Technological Chemistry:

Academic year 2009/10 (1st Semester):

- (1) *Qualidade, Ambiente e Segurança (Lecture): 2 h;*

Academic year 2010/11 (2nd Semester):

- (1) *Química Analítica I (Lectures and exercises): 51 h;*

Academic year 2012/13 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*

Academic year 2013/14 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*
- (2) *Metrologia Química (Lectures and exercises): 42 h;*

Academic year 2014/15 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*
- (2) *Metrologia Química (Lectures and exercises): 42 h;*

Academic year 2015/16 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*
- (2) *Metrologia Química (Lectures and exercises): 25 h;*

Academic year 2016/17 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*
- (2) *Metrologia Química (Lectures and exercises): 25 h (Course responsible);*

Academic year 2017/18 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*

Academic year 2018/19 (2nd Semester):

- (1) *Perspectivas em Investigação e Desenvolvimento (Lecture): 1 h;*
- (2) *Metrologia Química (Lectures and exercises): 25 h;*

Academic year 2019/20 (2nd Semester):

- (1) *Metrologia Química (Lectures and exercises): 25 h;*

Graduation in Energy and Environmental Engineering and Meteorology, Oceanography and Geophysics:

Academic year 2009/10 (1st Semester):

- (1) *Química Geral (laboratory practicals): 48 h;*

Academic year 2010/11 (2nd Semester):

- (2) *Introdução à análise química (laboratory practicals and exercises): 44 h;*

Academic year 2011/12 (2nd Semester):

- (1) *Introdução à análise química (laboratory practicals and exercises): 44 h;*

Academic year 2012/13 (2nd Semester):

- (1) *Introdução à análise química (laboratory practicals and exercises): 44 h;*

Academic year 2013/14 (2nd Semester):

- (1) *Introdução à análise química (laboratory practicals and exercises): 44 h;*

Metrology in Chemistry

Academic year 2011/12 (2nd Semester):

- (1) *Metrology in Chemistry: Erasmus students Paulina Bigus e Barbara Zaremba: 10 h (April).*

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Master in Marine Sciences

Academic year 2011/12 (2nd Semester):

(1) *Química do Meio Aquático (Lectures and laboratory practical): 5 h.*

Academic year 2012/13 (2nd Semester):

(1) *Química do Meio Aquático (Lecture): 2 h;*

Academic year 2013/14 (2nd Semester):

(1) *Química do Meio Aquático (Lecture): 2 h;*

Academic year 2014/15 (2nd Semester):

(1) *Química do Meio Aquático (Lecture): 2 h;*

Academic year 2015/16 (2nd Semester):

(1) *Química do Meio Aquático (Lecture): 2 h;*

Academic year 2016/17 (2nd Semester):

(1) *Química do Meio Aquático (Lecture): 2 h.*

Faculty (14) Erasmus Mundus - Master Course in Chemical Innovation and Regulation (EMMC-ChIR)

Description Consortium of 4 Universities of 4 European countries.
Course (year/date) *Module: Estimation of Uncertainty in Chemical Analysis (10 h)*
(1) *Faro (Portugal): 6-10 March 2017.*

Faculty (13) State University of São Paulo (UNESP) Faculdade de Ciências Farmacêuticas de Araraquara

Description Pós-Graduação em Alimentos e Nutrição
Course (year/date) (1) *Incerteza da Medição em Química (17 October 2016, 4 h).*

Faculty (12) State University of São Paulo (UNESP) Instituto de Química de Araraquara

Description Pós-Graduação em Química
Course (year/date) (1) *Incerteza da Medição em Química (13 October 2016, 4 h).*

Faculty (11) State University of São Paulo (UNESP) Instituto de Biociências, Letras e Ciências Exatas de São José do Rio Preto

Description Pós-Graduação em Química
Course (year/date) (1) *Incerteza em Análises Químicas – Abordagens Alternativas da Incerteza de Medições em Química (12-15 October 2016, 16 h).*

Faculty (10) State University of São Paulo (UNESP) Instituto de Biociências, Letras e Ciências Exatas de São José do Rio Preto

Description Pós-Graduação em Química
Course (year/date) (1) *Metrologia aplicada a Química Analítica (25-29 November 2013, 25 h).*

Faculty (9) State University of São Paulo (UNESP) Instituto de Química de Araraquara

Description Pós-Graduação em Química
Course (year/date) (1) *A importância da Metrologia em Química no mercado e no meio acadêmico (21 November 2013, 3.5 h).*

Faculty (8) State University of São Paulo (UNESP) Faculdade de Ciências Farmacêuticas de Araraquara

Description Pós-Graduação em Alimentos e Nutrição
Course (year/date) (1) *Aspectos importantes na validação de métodos analíticos e na transferência para a rotina (18 November 2013, 3.5 h).*

Faculty (7) Faculty of Pharmacy of the University of Lisbon

Description Mestrado de Controlo de Qualidade e Toxicologia de Alimentos
Course (year/date) (3) *Controlo da Qualidade da Medição (17 May 2012, 4h);*
(2) *Avaliação da incerteza da medição em Análises Químicas (19 May 2011, 3h);*
(1) *Avaliação da incerteza da medição em Análises Químicas (14 May 2010, 4 h).*

Faculty (6)	Euromaster Measurement Science in Chemistry
Description	Consortium of 9 Universities of 7 European countries. Master accredited by ECTNA ("European Chemistry Thematic Network Association"). Participation in the examination. Summer School on Measurement Science in Chemistry
Course (year/date)	<i>Alternative Approaches for the Quantification of Measurement Uncertainty (7 h)</i> (1) Celje (Slovenia): 9 August 2008; (2) Blagoevgrad (Bulgaria): 8 July 2009; (3) Lepanina (Estonia): 24 July 2010; (4) Poznań (Poland): 18 and 19 July 2011. <i>Principles of the evaluation of the measurement uncertainty (3.5 h)</i> (1) Fátima (Portugal): 20 July 2012 (Member of the organisation committee); (2) Lyon (France): 13 July 2013; (3) Casablanca (Morocco): 1 August 2014. <i>Internal Quality Control, External Quality Control and Interlaboratory Comparisons</i> (1) Casablanca (Morocco): 3 August 2014 (3.5 h); (2) Pulawy (Poland): 18 July 2015 (3.5 h); (3) Antwerp (Belgium): 16 July 2016 (3.5 h) (4) Druskininkai (Lithuania): 15 July 2017 (5 h) (5) Tallinn (Estonia): 13 July 2018 (5 h) (6) Lyon (France): 13 July 2019 (5h) (7) Online: 6 July 2020 (2h) <i>Compliance assessment</i> (1) Antwerp (Belgium): 13 July 2016 (4 h) (2) Druskininkai (Lithuania): 13 July 2017 (3.5 h) (3) Tallinn (Estonia): 12 July 2018 (3.5 h) (4) Lyon (France): 13 July 2019 (3.5h) (5) Online: 1 July 2020 (2h) <i>Exercises on the evaluation of the measurement uncertainty</i> (1) Druskininkai (Lithuania): 12 July 2017 (3.5 h) (2) Tallinn (Estonia): 11 July 2018 (2 h) (3) Online: 7 July 2020 (2 h) <i>Principles and exercises on the evaluation of the measurement uncertainty</i> (1) Lyon (France): 13 July 2019 (4.5h)
Faculty (5)	Erasmus Mundus - European Master in Quality in Analytical Laboratories (EMQAL)
Description	Consortium of 5 Universities of 4 European countries.
Course (year/date)	<i>Module: Introduction to Measurement Uncertainty (10-12.5 h)</i> <i>Module: Uncertainty Measurement in Chemical Tests (10-12.5h)</i> (1) Faro (Portugal): 20, 21, 27 and 28 March 2009; (2) Gdansk (Poland): 15-18 and 22-25 March 2010; (3) Barcelona (Spain): 21-24 February and 28 February-3 March 2011; (4) Faro (Portugal): 20-22 and 27-29 February 2012. (5) Cádiz (Spain): 6-8 and 11-13 March 2013. (6) Barcelona (Spain): 5-7 and 10-11 March 2014; (7) Bergen (Norway): 13-16 April 2015; <i>Module: Measurement Uncertainty Evaluation (merging of previous modules) (10 h)</i> (1) Gdansk (Poland): 29 February-3 March 2016; (2) Faro (Portugal): 6-10 March 2017; (3) Cádiz (Spain): 12-15 March 2018.
Faculty (4)	Université libre de Bruxelles
Description	Lecture for PhD students
Course (year/date)	How important can pragmatic measurement uncertainty evaluations be? (Brussels, 22 March 2011, 0.5 h)
Faculty (3)	University of Trás-os-Montes e Alto Douro
Course (year/date)	(1) Avaliação de laboratórios de ensaios químicos: Experiência no acompanhamento de processos de acreditação como auditor técnico do IPAC, Licenciatura em "Ciência Alimentar" (5 March 2009, 2 h).

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Faculty (2) Independent University

Description Post-graduation “Organisation and Management of Laboratories and Quality Systems”
Course (year/date) (1) Lecture “Gas-chromatography” [Academic year 2003-2004];
(2) Lecturer and responsible of the course “Statistical methods” [Academic year 2003-2004].

Faculty (1) Faculty of Science of the University of Lisbon (Invited Lectures)

Course (year/date) (6) *Metrologia em Química, Mestrado em Química para o Ensino* (19 May 2003, 2 h);
(5) *Estimativa da Incerteza Associada a Etapas Analíticas de Transferência de Massa, Mestrado em Química Analítica Aplicada* (27 November 2000, 2 h);
(4) *Expressão de Resultados com Incerteza, Mestrado em Química Analítica Aplicada* (31 October 2000; 2h);
(3) *Electroforese Capilar, Mestrado em Electroquímica Aplicada - Ramo de Ambiente* (17 November 1999, 2 h);
(2) *Electroforese Capilar, Mestrado em Electroquímica Aplicada - Ramo de Electroanálise* (May 1999, 2 h);
(1) *Expressão de Resultados com Incerteza, Mestrado em Electroquímica Aplicada* (16-17 Dec. 1998, 4 h).

8.2.2. Supervisions

Faculty(35) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree BSc in Chemistry
Student Madalena Lourenço
Date Started in January 2021
Description *Thesis: “Avaliação objetiva da variação sazonal do nível tóxico de rio Trancão”.*
Mark On going at FCUL.

Faculty(34) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree MSc in Chemistry
Student Ariely Cardoso
Date Started in September 2020
Description *Thesis: “Avaliação detalhada da incerteza da medição de contaminantes e nutrientes no meio marinho”.*
Mark On going at the Hydrographic Institute of the Portuguese Navy.

Faculty(33) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree MSc in Chemistry
Student Ruben Costa
Date Started in September 2020
Description *Thesis: “Validação e avaliação da incerteza da amostragem, colheita e análise química de águas residuais”.*
Mark On going at Labelec-EDP.

Faculty(32) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree PhD in Chemistry
Student Catarina Rocha
Date Started in January 2020
Description *Thesis: “Avaliação metrológica otimizada e geoquímica de tendências em sistemas estuarinos e oceânicos”.*
Mark On going at the Hydrographic Institute of the Portuguese Navy.

Faculty(31) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree PhD in Chemistry
Student Carlos Borges
Date Started in September 2019
Description *Thesis: “Avaliação metrológica otimizada e geoquímica de tendências em sistemas estuarinos e oceânicos”.*
Mark On going at the Hydrographic Institute of the Portuguese Navy.

Faculty(30) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree PhD in Chemistry
Student Vanessa Moreira Morgado
Date Started in January 2019
Description *Thesis: “Avaliação de riscos, tendências e estratégias de mitigação da contaminação de microplásticos no meio marinho”.*
Mark On going at the Hydrographic Institute of the Portuguese Navy.

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Faculty(29)	Faculty of Physical Education and Sport – Lusofona University (Co-supervisor)
Degree	PhD in Physical Education and Sports
Student	António Júlio Vitorino Nunes
Date	30 June 2020
Description	<i>Thesis: “Deteção de doping no desporto através de alterações hematológicas multivariadas: Desafios Examinológicos e Jurídicos”.</i>
Mark	Very good
Faculty(28)	Instituto de Química – Universidade de São Paulo Faculdade de Ciências da Universidade de Lisboa Instituto Hidrográfico da Marinha Portuguesa
Degree	Post-doctoral in Chemistry
Student	Tony Dadamos
Date	October 2019
Description	Marine Protection - Bayesian assessments for the optimization of the sampling uncertainty in the monitoring of contaminants in the marine environment to anticipate relevant threats
Mark	Successfully completed with publications.
Faculty(27)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	BSc in Chemistry
Student	Ariely Bastos Cardoso
Date	29 October 2020
Description	<i>Thesis: “Determinação do teor médio de fósforo total numa área alargada do rio Tejo - Desenvolvimento de procedimento baseado em cromatografia iónica e avaliação da incerteza</i>
Mark	19 Points
Faculty(26)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	Tânia Filipa Rodrigues Cordeiro
Date	13 December 2020
Description	<i>Thesis: “Identificação de substâncias dopantes em fluidos biológicos de atletas por LC-MS: Definição de critérios de identificação e avaliação da incerteza do exame”. Work conducted at the ‘Laboratório de Análises de Dopagem’ (Doping Analysis Laboratory).</i>
Mark	17 Points
Faculty(25)	Faculty of Sciences of the University of Lisbon
Degree	Training on the evaluation of the measurement uncertainty for a PhD in Analytical Chemistry
Student	María del Rocío Mateos Medina (Universidad de Alcalá)
Date	September 2018 – December 2018
Description	Training on the top-down and bottom-up evaluation of the measurement uncertainty
Mark	Successfully completed with publications.
Faculty(24)	Faculty of Sciences of the University of Lisbon
Degree	Post-doctoral in Chemistry
Student	Prof. Felipe Rebello Lourenço (Universidade de São Paulo)
Date	December 2017 – July 2018
Description	<i>Thesis: “Using measurement uncertainty in performance evaluation of analytical methods”.</i>
Mark	Successfully completed with publications.
Faculty(23)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	Luís Gonçalo Brás Gomes
Date	17 October 2018
Description	<i>Thesis: “Determination of partition coefficients between passive samplers and the aquatic environment for trace levels of organic pollutants”. Work conducted at the Research Centre for Toxic Compounds in the Environment of the Faculty of Science of Masaryk University.</i>
Mark	19 points.

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Faculty(22)	Universidade Estadual Paulista (Co-supervisor)
Degree	PhD in Chemistry
Student	Tony Rogério de Lima Dadamos (First PhD in the campus of São José do Rio Preto of UNESP)
Date	24 January 2018
Description	<i>Thesis: “Desenvolvimento, otimização, validação e comparação de diferentes abordagens para a avaliação da incerteza na determinação eletroquímica de ácido úrico em soro”.</i>
Mark	Maximum Score (Ricardo Bettencourt da Silva was the President of the Jury)
Faculty(21)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	José Narciso
Date	20 October 2017
Description	<i>Thesis: “Estimativa e Otimização da Incerteza em Análises Qualitativas: Identificação de substâncias dopantes em matrizes biológicas”.</i> Work conducted at the ‘Laboratório de Análises de Dopagem’ (Doping Analysis Laboratory).
Mark	20 points (Maximum Score)
Faculty(20)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	Vanessa Moreira Morgado
Date	31 July 2017
Description	<i>Thesis: “Comparação de abordagens de avaliação da incerteza da medição de metais em sedimentos”.</i> Work conducted at the Instituto Hidrográfico (Hydrographic Institute).
Mark	20 points (Maximum Score)
Faculty(19)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	BSc in Chemistry
Student	Tânia Luísa Pereira Marques Simões
Date	6 July 2017
Description	<i>Thesis: “Desenvolvimenmto de uma metodologia de purificação para a determinação simultânea de PAH, PCB e pesticidas em sedimentos”.</i> Work conducted at the Instituto Hidrográfico (Hydrographic Institute).
Mark	19 points
Faculty(18)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	BSc in Chemistry
Student	Ana Rita Figueira
Date	29 July 2016
Description	<i>Thesis: “Validação da determinação de ião fosfatos em águas por cromatografia iónica”.</i>
Mark	17 points
Faculty(17)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	BSc in Chemistry
Student	Iryna Rehan
Date	26 July 2016
Description	<i>Thesis: “Avaliação da qualidade dos calibradores em quantificações instrumentais”.</i> Work conducted at the Instituto Hidrográfico (Hydrographic Institute).
Mark	19 points
Faculty(16)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	PhD in Chemistry
Student	Pedro Alexandre dos Santos Salgueiro
Date	25 July 2016
Description	<i>Thesis: “Desenvolvimento de modelos quimiométricos com fiabilidade examinológica conhecida para a previsão de acelerantes de combustão em amostras de resíduos de incêndios”.</i>
Mark	Maximum score (Aprovado com Distinção e Louvor)

Curriculum Vitae

Ricardo Bettencourt da Silva

Faculty(15) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree MSc in Chemistry
Student Rui Cordeiro
Date 16 October 2015
Description *Thesis: "Implementação, validação e controlo da qualidade da determinação de metais em águas naturais, de consumo humano e residuais por ICP-OES". Work conducted at the EDP-Electricidade de Portugal (company of the energy sector).*
Mark 19 points (maximum of 20 points)

Faculty(14) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree MSc in Chemistry
Student Ana Cecília Rocha
Date 15 September 2015
Description *Thesis: "Validação e controlo da qualidade da identificação e quantificação de corantes em alimentos por HPLC-UV/Vis". Work conducted at the ASAE (Economic and Food Safety Authority).*
Mark 19 points (maximum of 20 points)

Faculty(13) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree BSc in Chemistry
Student Luís Gonçalo Brás Gomes
Date 23 July 2015
Description *Thesis: "Validação da determinação de metais em sedimentos por espectrometria de absorção atómica com chama". Work conducted at the Instituto Hidrográfico.*
Mark 19 points (maximum of 20 points)

Faculty(12) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree MSc in Chemistry
Student Rudi Lopes
Date 5 November 2014
Description *Thesis: "Validação da Quantificação de Catinonas por ^1H qNMR em drogas com efeitos psicoativos".*
Mark 18 points (maximum of 20 points)

Faculty(11) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree BSc in Chemistry
Student Joana Filipa da Silva Pereira
Date 26 September 2014
Description *Thesis: "Validação da quantificação de alguns componentes iónicos da água do mar por cromatografia iónica com deteção UV-VIS".*
Mark 16 points (maximum of 20 points)

Faculty(10) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree BSc in Chemistry
Student Nuno Figueiredo da Silva Rosa
Date 12 September 2014
Description *Thesis: "Optimização da quantificação da eficiência da fotodegradação catalítica de uma solução de azul de metileno".*
Mark 18 points (maximum of 20 points)

Faculty(9) Faculty of Sciences of the University of Lisbon (Co-supervisor)

Degree MSc in Chemistry
Student Joana Filipa Palmeira Rodrigues
Date 7 December 2012
Description *Thesis: "Optimização da incerteza da determinação, por cromatografia iónica, da composição maioritária e vestigial de soluções salinas".*
Mark 19 points (maximum of 20 points)

Curriculum Vitae

Ricardo Bettencourt da Silva

Faculty(8)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	Beatriz Tavares da Silva Flores Brasil
Date	5 December 2012
Description	<i>Thesis: "Implementação e validação de uma metodologia para a detecção e quantificação de substâncias explosivas inorgânicas". Work conducted at the Portuguese Criminal Police (PJ).</i>
Mark	19 points (maximum of 20 points)
Faculty(7)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	Ana de Pina Garcia Correia
Date	4 December 2012
Description	<i>Thesis: "Desenvolvimento de modelos metroológicos detalhados da determinação de metais pesados em correctivos orgânicos". Work conducted at the Portuguese Ministry of Agriculture and Sea (MAM-INIAV).</i>
Mark	19 points (maximum of 20 points)
Faculty(6)	Faculty of Sciences of the University of Lisbon (Supervisor)
Degree	Erasmus Project (Master graduation)
Student	Iuliia Demchuk
Date	January 2012
Description	<i>Project: "Assessment of the metrological performance of the identification and quantification of food dyes in aqueous solutions".</i>
Mark	18 points (maximum of 20 points)
Faculty (5)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Technological Chemistry
Student	Daniel Mendes Silveira
Date	23 September 2011
Description	<i>Thesis: "Implementação e validação de identificação e quantificação de agentes lacrimogéneos em armas de defesa pessoal". Work conducted at the Portuguese Criminal Police (PJ).</i>
Mark	19 points (maximum of 20 points)
Faculty (4)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	BSc in Chemistry
Student	Alejandro Arias Fachado
Date	27 July 2011
Description	<i>Thesis: "Desenvolvimento de um modelo de medição detalhado para a determinação da composição iónica da fracção de aerossóis atmosféricos solúvel em água, por cromatografia iónica" (Erasmus programme).</i>
Mark	19 points (maximum of 20 points)
Faculty (3)	Faculty of Sciences of the University of Lisbon (Co-supervisor)
Degree	MSc in Chemistry
Student	Alexandra Maria Emídio Viana da Silva
Date	4 May 2010
Description	<i>Thesis: "Avaliação e optimização da incerteza associada ao cálculo da eficiência de remoção da carência química de oxigénio numa estação de tratamento de águas residuais".</i>
Mark	18 points (maximum of 20 points)
Faculty (2)	University of Trás-os-Montes e Alto Douro (Co-supervisor)
Degree	MSc in Environmental Technologies
Student	Sara Inês Paredes Prada
Date	22 January 2010
Description	<i>Thesis: "Determinação do Rendimento Quântico da Fotodegradação do Butilparabeno com Radiação UV".</i>
Mark	17 points (maximum of 20 points)

Faculty (1) Technical University of Lisbon

Degree MSc in Food Sciences and Engineering
Student Fernanda Vilarinho
Date 28 September 2007
Description *Thesis: "Validação da Determinação de Resíduos de Pesticidas em Produtos Transformados de Origem Vegetal para Alimentação Infantil"*
Mark Maximum score

8.2.3. Academic juries

Faculty (14) Universidade de Aveiro

Degree MSc in Chemistry
Student Cristina Dara Velho Rodrigues
Date 25 July 2019
Description *Thesis: "Medicamentos genéricos contêm mais impurezas" (Arguente Principal).*

Faculty (13) Universidade de Lisboa

Degree MSc in Chemistry
Student Mónica Sofia Soares Antunes
Date 20 November 2018
Description *Thesis: "Desenvolvimento de Novas Metodologias Analíticas para a Identificação de Novas Substâncias Psicoativas em Matrizes Biológicas" (Arguente Principal).*

Faculty (12) University of Aveiro

Degree MSc in Chemistry
Student Nathalie Gaspar Ferreira
Date 26 July 2016
Description *Thesis: "Validation of a method for metal analysis in fish by inductively coupled plasma techniques" (Arguente Principal).*

Faculty (11) New University of Lisbon

Degree PhD Thesis Plan Proposal
Student Ana Rita Lourinho Ferreira
Date 26 July 2016
Description *Thesis: "Electrokinetic removal of emerging contaminants from effluent and soil for agricultural use"*

Faculty (10) University of Aveiro

Degree MSc in Chemistry
Student César Rafael Marques Tavares
Date 22 December 2015
Description *Thesis: "Desenvolvimento e validação de um método analítico para quantificação multielementar em cabelo humano por ICP no LCA" (Arguente Principal).*

Faculty (9) University of Aveiro

Degree MSc in Chemistry
Student Ana Teresa Marques de Matos
Date 22 December 2015
Description *Thesis: "Implementação de melhorias na quantificação de metais em água de empresa A. Logos" (Arguente Principal).*

Faculty (8) University of Aveiro

Degree MSc in Chemistry
Student Pedro Tiago Silva Pinto
Date 24 July 2015
Description *Thesis: "Implementação de melhorias nos requisitos de gestão e técnicos do LCA" (Arguente Principal).*

Curriculum Vitae

Ricardo Bettencourt da Silva

Faculty (7)	University of Aveiro
Degree	MSc in Chemistry
Student	Ana Filipa Costa
Date	24 July 2014
Description	<i>Thesis: "Quantificação de mercúrio em água de consumo: validação do método na Luságua" (Arguente Principal).</i>
Faculty (6)	University of Aveiro
Degree	MSc in Chemistry
Student	Tatiana Pereira Valente
Date	24 July 2014
Description	<i>Thesis: "Implementação da acreditação flexível global no LCA" (Arguente Principal).</i>
Faculty (5)	University of Aveiro
Degree	MSc in Environmental Engineering
Student	Ricardo Pinto
Date	21 December 2010
Description	<i>Thesis: "Aplicação de sensores em processos de medida de misturas gasosas" (Departamento de Ambiente e Ordenamento) (Arguente Principal).</i>
Faculty (4)	High Institute of Engineering of Lisbon (ISEL)
Degree	MSc in Chemical Engineering
Student	Hugo Carapinha
Date	17 December 2010
Description	<i>Thesis: "Implementação e validação de uma metodologia analítica forense para a detecção/identificação de explosivos orgânicos" (Arguente Principal).</i>
Faculty (3)	Faculty of Science of the University of Lisbon
Degree	PhD in Chemistry
Student	Maria Graça Leitão Dias
Date	26 January 2010
Description	<i>Thesis: "Contributo para a caracterização fitoquímica de frutos e produtos hortícolas portugueses" (Arguente).</i>
Faculty (2)	Faculty of Sciences of the University of Lisbon
Degree	MSc in Technological Chemistry
Student	Daniel Mendes Silveira
Date	June 2009
Description	<i>Thesis: "Acidez atmosférica" (Arguente Principal).</i>
Faculty (1)	Faculty of Sciences of the University of Lisbon
Degree	MSc in Chemistry
Student	Maria Clara Figueira de Oliveira Candeias
Date	17 December 2008
Description	<i>Thesis: "Qualidade Analítica na Indústria da Pasta e Papel" (Arguente Principal).</i>

8.3. Training and Training Courses

(62) *The evaluation of the measurement uncertainty in the PT schemes from the point of view of suppliers and participants*, PTConf 2018 – International Proficiency Testing Conference, Oradea (Romania), 10-13 September 2019.

(61) *Utilização da incerteza da medição em avaliações de conformidade*, 3º Congresso Brasileiro de Qualidade em Laboratórios (Congresso on-line), 25-29 Março 2019.

(60) *A Two-Day Training Course – Critical Issue of the accreditation standards – ISO/IEC 17025:2017 and ISO 15189:2012 (Eurachem)*(Presented topics: (1) Uncertainty from sampling; (2) The use of a decision rule; (3) Target uncertainty), Nicosia (Cyprus), 21-22 February 2019 (4h).

(59) *Gestão de risco em avaliações de conformidade: Utilização da incerteza da medição em avaliações de conformidade*, ULS – Guarda, 8 November 2018 (3h)

(58) *Estatística Aplicada e Laboratórios de Ensaio*, General Electric, Setúbal, 6 Junho 2018 (7h)

(57) *Utilização da incerteza da medição em avaliações de conformidade*, 2º Congresso Brasileiro de Qualidade em Laboratórios (Congresso on-line), 20 Abril 2018.

Curriculum Vitae

Ricardo Bettencourt da Silva

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- (56) *Estimativa da incerteza em métodos quantitativos e qualitativos – Treinamento Internacional: Validação de Métodos (ISO/IEC 17025)*, Instituto Biológico, São Paulo (Brazil) (5h30), 22 January 2018.
-
- (55) *Incerteza de Medição: Princípios (TrainMiC course – Introdução à Metrologia Química)*, FCUL - Lisbon (3 h), 11 December 2017.
-
- (54) *Implementação, Validação e Controlo da Qualidade da Identificação de Compostos por GC-MS e LC-MS*, RELACRE – Lisbon (14 h), 13-14 November 2017.
-
- (53) *Avaliação da Incerteza de Medições em Química*, Centro Tecnológico do Calçado de Portugal (14 h), 26 e 27 October 2017.
-
- (52) *TrainMiC Course, Measurement uncertainty: Principles and approaches to the evaluation of the measurement uncertainty - TrainMiC® - The evaluation of the measurement uncertainty with focus on the instrumental methods of analysis as well as with focus on the PT results*, PTConf 2018 – International Proficiency Testing Conference, Cluj Napoca (Romania), 6 October 2017 (5 h).
-
- (51) *Abordagem “top-down” intralaboratorial de avaliação da incerteza da medição*, Bureau Veritas, Lisbon, 17 February 2017 (8h)
-
- (50) *Implementação, Validação e Controlo da Qualidade da Identificação de Compostos por GC-MS e LC-MS*, RELACRE – Lisbon (14 h), 7-8 November 2016.
-
- (49) *Incerteza de Medição: Abordagens para Avaliação (TrainMiC course – Introdução à Metrologia Química)*, IPMA - Algés (1.5 h), 25 October 2016.
-
- (48) *Validação, Controlo da Qualidade e Avaliação da Incerteza de Medições em Química*, Instituto Hidrográfico – Lisbon (77 h), 13 and 27 April, 25 May, 7 July, 1 September, 20 September and 2 November 2016, and 12 and 16 January, 19 April and 31 October 2017.
-
- (47) *Abordagens Alternativas de Avaliação da Incerteza de Medições em Química*, AIM - Iberol, Alhandra (14 h), 28 e 29 September 2016.
-
- (46) *Validação, Controlo da Qualidade e Avaliação da Incerteza de Medições em Química*, (Trainee: Yelda Gultekin) – Lisbon (14 h), 11 and 18 March 2016.
-
- (45) *Abordagens Alternativas de Avaliação da Incerteza de Medições em Química*, AIM – Lisbon (14 h), 14-15 January 2016.
-
- (44) *Validação, Incerteza e Controlo da Qualidade de Resultados (Pós-graduação em Gestão de Laboratórios)*, ISQ – Oeiras (28 h), 9, 16 and 23 January 2016.
-
- (43) (i) *Incerteza de Medição: Princípios* and (ii) *Exemplo de aplicação: Determinação, por espectrofotometria, de fósforo reactivo em águas naturais (SMEWW 4500-P D) (TrainMiC course – Introdução à Metrologia Química)*, FCUL - Lisbon (5.5 h), 23-24 November 2015.
-
- (42) *Incerteza de Medição: Princípios (TrainMiC course – Introdução à Metrologia Química)*, FCUL - Lisbon (3 h), 24-25 November 2014.
-
- (41) (i) *Incerteza de Medição: Princípios*, (ii) *Incerteza de Medição: Abordagens para Avaliação* and (iii) *Exemplo de aplicação: Determinação, por espectrofotometria, de fósforo reactivo em águas naturais (SMEWW 4500-P D) (TrainMiC course – Introdução à Metrologia Química)*, FCUL - Lisbon (6.5 h), 24-25 October 2013.
-
- (40) (i) *Incerteza de Medição: Princípios*, (ii) *Incerteza de Medição: Abordagens para Avaliação* and (iii) *Exemplo de aplicação: Determinação, por espectrofotometria, de fósforo reactivo em águas naturais (SMEWW 4500-P D) (TrainMiC course – Introdução à Metrologia Química)*, ASAE - Lisbon (6.5 h), 22-24 November 2012.
-
- (39) (i) *Incerteza de Medição: Abordagens para Avaliação* and (ii) *Exemplo de aplicação: Determinação, por espectrofotometria, de fósforo reactivo em águas naturais (SMEWW 4500-P D) (TrainMiC course – Introdução à Metrologia Química)*, LNEG - Lisbon (4 h), 28 July 2011.
-
- (38) (i) *Incerteza de Medição: Princípios*, (ii) *Incerteza de Medição: Abordagens para Avaliação* and (iii) *Exemplo de aplicação: Determinação, por espectrofotometria, de fósforo reactivo em águas naturais (SMEWW 4500-P D) (TrainMiC course – Introdução à Metrologia Química)*, Portucel - Setúbal (6 h), 30 June and 1 July 2011.
-
- (37) *Ferramentas de controlo da qualidade analítica*, Infarmed - Lisbon (7 h), 25 January 2011.
-
- (36) *Ferramentas de controlo da qualidade analítica*, IBET - Oeiras (14 h), 28 June and 5 July 2010.
-
- (35) (i) *Incerteza de Medição: Princípios*, (ii) *Incerteza de Medição: Abordagens para Avaliação* and (iii) *Exemplo de aplicação: Determinação, por espectrofotometria, de fósforo reactivo em águas naturais (SMEWW 4500-P D) (TrainMiC course – Introdução à Metrologia Química)*, FCUL - Lisbon (6 h), 28 May 2010.
-
- (34) *Uncertainty of measurement: Principles – Training material presentation*, Workshop Training New Trainers, TnT (TrainMiC), Geel, Belgium (0.5 h) 27 March 2010.
-
- (33) *Requisitos Técnicos da Norma ISO/IEC 17025:2005*, Direcção Regional de Agricultura e Desenvolvimento Rural da Região Autónoma da Madeira - Funchal (3.5 h), 5 November 2009.
-
- (32) *Incerteza de Resultados de Medições (TrainMiC course – Introdução à Metrologia Química)*, Empresa Pública de Águas Livres (EPAL) - Vale da Pedra (1.5 h), 12 and 13 February 2009.
-
- (31) *Incerteza de Resultados de Medições (TrainMiC course – Introdução à Metrologia Química)*, FCUL - Lisbon (1.5 h), 13 and 14 November 2008.
-
- (30) *Curso de Espectrometria de Emissão Atómica com Plasma (ICP) – Da teoria à prática*, Specanalítica Lda. - Carcavelos (21 h), 10-12 November 2008.
-
- (29) *Incerteza de Resultados de Medições (TrainMiC course – Introdução à Metrologia Química)*, Instituto Politécnico de Tomar (1.5 h), 8 and 9 May 2008.
-
- (28) *Cromatografia de Fase Gasosa – Princípios Básicos*, Universidade de Trás-os-Montes e Alto Douro (4 h), 17 March 2008.
-
- (27) *Ferramentas de Controlo da Qualidade para Ensaios Físico-Químicos*, Direcção Regional de Agricultura e Desenvolvimento Rural da Região Autónoma da Madeira – Camacha (14 h), 12 and 13 February 2008.
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Ricardo Bettencourt da Silva

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- (26) *Quantificação da Incerteza em Ensaio Físico-Químicos*, IBET - Oeiras (24 h), 9-11 January and 8 February 2008.
-
- (25) *Cromatografia de Fase Gasosa – Princípios e Aplicações*, Air Liquide - Agueda (21 h), 18-20 December 2007.
-
- (24) *Quantificação da Incerteza em Análise Químicas – Princípios e Exemplos and Ferramentas de Controlo da Qualidade*, Aqualab – Laboratório Clínico e de Saúde Pública Lda. - Albufeira (14 h), 23-24 November 2007.
-
- (23) *Ferramentas de Controlo da Qualidade para Ensaio Físico-Químicos*, Specanalítica Lda. – Carcavelos (14 h), 21-22 November 2007.
-
- (22) *Incerteza de Resultados de Medições (TrainMiC course – Introdução à Metrologia Química)*, IPQ - Caparica (1.5 h), 15 and 16 November 2007.
-
- (21) *Incerteza nas Análises Químicas – Abordagens Alternativas*, Direcção Regional de Agricultura e Desenvolvimento Rural da Região Autónoma da Madeira – Camacha (28 h) 9, 10, 12 and 13 July 2007.
-
- (20) *Análise de Resíduos de Pesticidas em Alimentos de Origem Vegetal por GC-TOF/MS – Validação de métodos e controlo da qualidade dos ensaios*, DGPC (5 h), 27 July 2007 [Financed by a protocol between “Ministério da Agricultura, Pecuária e Abastecimento da República Federativa do Brasil” and “Ministério da Agricultura, Desenvolvimento Rural e das Pescas de Portugal”; Trainees: 9 analysts of Brazilian laboratories].
-
- (19) *Incerteza nas Análises Químicas – Abordagens Alternativas*, DGPC (19 h), 19, 20 and 27 July 2007 [Financed by a protocol between “Ministério da Agricultura, Pecuária e Abastecimento da República Federativa do Brasil” and “Ministério da Agricultura, Desenvolvimento Rural e das Pescas de Portugal”; Trainees: 9 analysts of Brazilian laboratories].
-
- (18) *Seleção e Interpretação de Resultados de Ensaio Interlaboratoriais*, Specanalítica Lda. - Carcavelos (7 h), 2 July 2007.
-
- (17) *Quantificação da Incerteza em Laboratórios Acreditados: Ensaio Físico-Químicos*, Specanalítica Lda. - Carcavelos (21 h), 26-28 March 2007.
-
- (16) *Estatística Aplicada a Laboratórios de Ensaio*, INETI – Lisbon (35 h), 9, 10, 13, 20 and 21 November 2006.
-
- (15) *Introdução ao conceito de Incerteza da Medição*, Infarmed - Lisbon (4 h), 24 October 2006.
-
- (14) *Estatística Aplicada a Laboratórios de Ensaio*, RELACRE - Lisbon (Two courses of 35 h):
- 16-20 October 2006;
 - 8 a 12 de Outubro de 2007.
-
- (13) *Validação de Métodos e Quantificação da Incerteza em Ensaio Químicos*, CIREs - Estarreja (14 h), 5-6 September 2006.
-
- (12) *Validação de Métodos Analíticos com vista à Acreditação de acordo com a Norma ISO/IEC 17025*, Medinfar - Amadora (7 h) 25 November 2005.
-
- (11) *Incerteza nas Análises Químicas – Princípios e Abordagens Alternativas*, DGPC - Oeiras (14 h), 18-19 July 2005.
-
- (10) *Requisitos Técnicos da Norma ISO/IEC 17025:2005*, Medinfar - Amadora (7 h), 14-15 July 2005.
-
- (9) *Análise de Resíduos de Pesticidas em Alimentos de Origem Vegetal*, DGPC - Oeiras (Two courses of 16 h) [Two trainees]:
- Tiago S. Branco, 2004.
 - Célia Bento, 2004.
-
- (8) *Incerteza nas Análises Químicas – Princípios e Abordagens Alternativas*, Casa de Saúde de S. Mateus - Viseu (7 h), 26 and 27 November 2004.
-
- (7) *Incerteza nas Análises Químicas – Abordagens Alternativas*, RELACRE - Lisbon (Five training courses of 21 h):
- 27-28 September and 2 November 2004.
 - 21-22 de Março and 20 May 2005.
 - 27-29 March 2006.
 - 29-31 May 2007.
 - 14-16 de Abril de 2010
-
- (6) *Estatística Aplicada a Laboratórios de Análise*, Direcção-Regional de Agricultura do Algarve - Faro (14 h), 20 and 21 November 2003.
-
- (5) *Análise de Resíduos de Pesticidas em Alimentos de Origem Vegetal*, DGPC - Oeiras (40 h) [Trainee: Mr. Alberto Andrade, Heinz-Portugal], 2002.
-
- (4) *Aplicação de Estatística à Química Analítica*, DGPC - Oeiras (8 h), 5 and 21 April 2000.
-
- (3) *Expressão de Resultados com Incerteza*, Controlab Lda. – Póvoa de Santa Iria (21 h), 18-20 March 1998.
-
- (2) *Espectrometria de Absorção Atómica*, Controlab Lda. – Povo de Santa Iria (Five training courses of 21 h):
- 16-18 April 1997;
 - 22-24 April 1998;
 - 22-23 June 1998;
 - 25-26 June 1998;
 - 2-4 December 1998.
-
- (1) *Instrumentação de Espectrometria de Absorção Atómica com Chama*, INETI - Lisbon (Two training courses of 7h):
- Trainee: Eng.º Luís Sousa, Instituto dos Materiais de Produção (IMP-INETI), 1994;
 - Trainee: Eng.º Nuno Silva, Centro Tecnológico das Indústrias do Couro, 1995

9. Workshops and Scientific Meetings

- (114) IDEIA 2021 – Innovation in Maritime Operations: Aligning with Academia and Industry, (Online) 26-27 January 2021.
- (113) 6º Jornadas de Engenharia Hidrográfica e 1º Jornadas Luso-Espanholas de Hidrografia.
- (112) Analítica 2020 (Keynote), (Online) 27-28 October 2020.
- (111) 1º Encontro Internacional de Metrologia e Examinologia em Química, (Online) 22 e 23 Outubro 2020.
- (110) e-Eurachem WS – Quality assurance for analytical laboratories in the university curriculum, (Online), 14-15 July 2020.
- (109) Validação e Incerteza de Análises Qualitativas: Princípios e (Bons e Maus) Exemplos, 3º Webinar ForMEQ, (Online), 8 July 2020.
- (108) CQE Days 2020, Online, 28-29 May 2020.
- (107) Eurachem/Eurolab Workshop – Uncertainty from sampling and analysis for accredited laboratories, Berlin (Germany), 19–20 November 2019.
- (106) Ciências Research Day 2019, Lisboa (Portugal), 30 October 2019.
- (105) RELACRE – Quantificação da Incerteza de Medição em Ensaios Químicos e Físico-Químicos: Perspetivas de Aplicação, Lisboa (Portugal), 10 October 2019
- (104) PT Conf 2019 – International Proficiency Testing Conference, Oradea (Romania) 10-13 September 2019.
- (103) 4th Meeting of the CQUL – Chemistry: Sharing the future, Lisbon (Portugal) 16-19 July 2019.
- (102) CQE Days – 2019 Spring Meeting, Lisbon (Portugal), 30-31 May 2019.
- (101) Eurachem Workshop “Validation of targeted and non-targeted methods of analysis”, Tartu (Estonia) 20-21 May 2019.
- (100) 34th CITAC Members' Meeting and Workshop, Paris (France) 13 April 2019.
- (99) Isranalytica 2019, Tel Aviv (Israel) 22-23 January 2019.
- (98) Pre Conference Satellite Event – Isranalytica 2019, Quality of Test Results for Conformity Assessment of a Chemical Composition: What is Good and What is Bad?, Ramat Gan (Israel), 21 January 2019.
- (97) CONFMET 2018 – Conferência Nacional da SPMET – Em constante evolução o Sistema Internacional de Unidades, Caparica (Portugal), 28-29 November 2018.
- (96) Seminário: A Importância da Qualidade nas Instituições, Aveiro (Portugal), 19 September 2018.
- (95) V Iberoamerican Congress of Laboratories - Conformity Assessment, Lisboa (Portugal) 17-19 October 2018.
- (94) Eurachem Scientific Workshop – Data – Quality, Analysis and Integrity, Dublin (Ireland) 14-15 May 2018.
- (93) 33th CITAC Members' Meeting and Workshop, Paris (France) 21 April 2018
- (92) Analítica 2018, Oporto (Portugal) 26-27 March 2018.
- (91) Eurachem Working Groups “Measurement Uncertainty & Traceability” and “Qualitative Analysis and Testing” Meetings, London (England), 22-23 November 2017
- (90) 7.º Encontro Nacional da SPMet – As medições para os transportes, Lisbon (Portugal) 17 November 2017.
- (89) A Master Class for those train staff from accredited laboratories, Caparica (Portugal), 24-26 September 2017 (Organisation Committee Member)
- (88) 6th International Proficiency Testing Conference, Cluj Napoca (Romania), 4-6 October 2017.
- (87) Eurachem General Assembly 2017, Nicosia (Cyprus), 1-2 June 2017: Participation as national delegate.
- (86) Eurachem Executive Committee Meeting, Nicosia (Cyprus), 1 and 2 June 2017.
- (85) Eurachem Working Groups “Measurement Uncertainty & Traceability” and “Qualitative Analysis and Testing” Meetings, Nicosia (Cyprus), 31 May 2017.
- (84) Eurachem Workshop: Uncertainty in Qualitative and Quantitative Analysis, Nicosia (Cyprus), 29-30 May 2017 (Scientific Committee Member).
- (83) Isranalytica 2017, Tel Aviv (Israel), 24-25 January 2017.
- (82) Pre-conference International Workshop – Validation of test methods, Human Errors and Measurement Uncertainty of Results, Tel Aviv (Israel), 23 January 2017.
- (81) CONFMET 2016 - Conferência Nacional da SPMet - As Medições Num Mundo Dinâmico, Évora (Portugal), 17-18 November 2016.
- (80) Workshop Qualidade dos Resultados de Medição, Caparica (Portugal), 27 October 2016.
- (79) Eurachem Executive Committee Meeting, Prague (Czech Republic), 6-7 October 2016.
- (78) Master Class Quality Assurance in Analytical Measurements, Zagreb (Croatia), 9-11 June 2016.
- (77) Analítica 2016 - 8th Meeting of the Analytical Chemistry Division, Lisbon (Portugal), 6-7 June 2016.
(Member of the Organisation Committee)
- (76) Dia aberto IPQ - Dia Mundial da Metrologia, Caparica (Portugal), 20 May 2016.
- (75) Eurachem General Assembly 2016, Gent (Belgium), 12-13 May 2016: Participation as national delegate.
- (74) Eurachem Executive Committee Meeting, Gent (Belgium), 12 and 13 May 2016.
- (73) Eurachem Working Groups “Measurement Uncertainty & Traceability” and “Qualitative Analysis and Testing” Meetings, Gent (Belgium), 11 May 2016.
- (72) Eurachem workshop - Method Validation in Analytical Science: Current Practices and Future Challenges, Gent (Belgium), 9-10 May 2016.
- (71) XVI Congresso Latino - Americano de Cromatografia, Lisbon (Portugal), 5-9 de January 2016.

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- (70) Workshop “*Incertezas em Ensaios Físico-Químicos*”: *Determinação, Validação e Uso da Incerteza*, RELACRE – Lisbon (Portugal), 25 November 2015.
-
- (69) *Eurachem Executive Committee Meeting 2015*, Graz (Austria), 25 September 2015.
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- (68) *Eurachem General Assembly 2015*, Warsaw (Poland), 28 May 2015: Participation as national delegate.
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- (67) *Eurachem Working Groups “Measurement Uncertainty & Traceability” and “Qualitative Analysis and Testing” Meetings 2015*, Warsaw (Poland), 27 May 2015.
-
- (66) *Eurachem Executive Committee Meeting 2015*, Warsaw (Poland), 26 and 28 May 2015.
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- (65) *Pittcon 2015*, New Orleans (USA), 8-12 March 2015.
-
- (64) *Marine Chemistry Working Group Meeting - International Council for the Exploration of the Sea (ICES)*, Lisbon (Portugal) - Instituto Hidrográfico, 3 March 2015.
-
- (63) *CQE Young Researchers Day*, IST – Lisbon (Portugal), 1 December 2014.
-
- (62) Workshop “*Avaliação da Incerteza em Ensaios Químicos – Simplificar adequando ao uso*”, ISQ – Oeiras (Portugal), 27 November 2014.
-
- (61) *ChemForum*, IST – Lisbon (Portugal), 12 November 2014.
-
- (60) Workshop “*Metrology for ocean salinity and acidity*”, PTB – Berlin (Germany), 16-17 June 2014.
-
- (59) *Eurachem General Assembly 2014*, Lisbon (Portugal), 22-23 May 2013: Participation as national delegate.
-
- (58) *Eurachem Working Group “Measurement Uncertainty & Traceability” Meeting 2014*, Lisbon (Portugal), 21-22 May 2014.
-
- (57) *Eurachem Workshop on Quality in Analytical Measurements*, Lisbon (Portugal), 19-21 May 2014.
(*Organisation of the event - member of the Scientific and Organisation Committees*)
-
- (56) *Eurachem Executive Committee 2014*, Lisbon (Portugal), 18 and 23 May 2013.
-
- (55) Workshop “*SPQ – Analítica 2014*”, Coimbra (Portugal), 14-15 April 2014.
-
- (54) Workshop “*Metrologia em Química e Qualidade – Impactos da Metrologia em Química na Academia e no Mercado*”, Workshop of the Association of Former UNESP Students, Instituto de Biociências, Letras e Ciências Exatas de São José do Rio Preto - São José do Rio Preto (Brazil), 22 November 2013.
-
- (53) *Joint IMEKO TC8, TC23 and TC24 Symposium on Traceability in Chemical, Food and Nutrition Measurements*, INSA – Lisbon (Portugal), 22-25 September 2013.
-
- (52) *2nd Middle Eastern and Mediterranean Sea Region Countries Mass Spectrometry Workshop – MASSA 2013*, Siena (Italy), 30 June – 4 July 2013.
-
- (51) *EMRP Workshop “Call for proposals for Joint Research Projects and associated Researcher Excellence Grants”*, PTB – Berlin (Germany), 24-25 June 2013.
-
- (50) *Eurachem General Assembly 2013*, Espoo (Finland), 23-24 May 2013: Participation as national delegate.
-
- (49) *Eurachem Working Group “Measurement Uncertainty & Traceability” Meeting 2013*, Espoo (Finland), 22 May 2013.
-
- (48) *Eurachem Workshop “Quality Assurance of Measurements from Field to Laboratory”*, Espoo (Finland), 20-21 May 2013.
-
- (47) *Eurachem Executive Committee 2013*, Espoo (Finland), 19 and 24 May 2013.
-
- (46) *5º Encontro Nacional SPMET – Medir com Segurança*, Coimbra (Portugal), 8 Novembro 2012.
-
- (45) *Key Challenges in Internal Quality Control*, Berlin (Germany), 10-11 October 2012.
(*Member of the Scientific Committee*)
-
- (44) *Eurachem General Assembly 2012*, Berlin (Germany), 24-25 May 2012: Participation as national delegate.
(*Nominated member of the Executive Committee*)
-
- (43) *Eurachem Working Group “Measurement Uncertainty & Traceability” Meeting 2012*, Berlin (Germany), 23 May 2012.
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- (42) *Eurachem/CITAC workshop “Validation, Traceability and Measurement Uncertainty - Challenges for the 21st Century’s analysts”*, Berlin (Germany), 21-22 May 2012.
(*Member of the Scientific Committee*)
-
- (41) *4º Encontro Nacional da SPMet, Metrologia – Suporte da Competitividade na Indústria*, ISQ – Oeiras (Portugal), 11 November 2011.
-
- (40) *Eurachem Working Group “Measurement Uncertainty & Traceability” Meeting 2011*, Lisbon (Portugal), 8 June 2013.
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- (39) *Eurachem/CITAC workshop “Recent developments in measurement uncertainty”*, Lisbon (Portugal), 6-7 June 2011.
(*Organisation of the event - member of the Scientific and Organisation Committees*)
-
- (38) *Eurachem General Assembly 2011*, Moscow (Russia), 26-27 May 2011: Participation as national delegate.
-
- (37) *Eurachem Working Group “Measurement Uncertainty & Traceability” Meeting 2011*, Moscow (Russia), 25 May 2011.
-
- (36) *Key quality assurance challenges for analytical measurements*, Moscow (Russia), 23-24 May 2011.
-
- (35) *CONFMET2010 - Medições na Ciência e na Tecnologia*, Lisbon (Portugal), 4-5 November 2010.
(*Chair of sessions “Medições na Ciência e na Tecnologia” and “Comparabilidade das Medições em Química”*)
(*Member of the Scientific Committee*)
-
- (34) *Eurachem Working Group “Measurement Uncertainty & Traceability” Meeting 2010*, Copenhagen (Denmark), 27 May 2010.
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- (33) *Analytical results for decisions!*, Copenhagen (Denmark), 25-26 May 2010.
-
- (32) *TrainMiC Editorial Board Meeting*, IRMM, Geel (Belgium), 27 March 2010.
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- (31) *TrainMiC Training of New Trainers*, IRMM, Geel (Belgium), 25-26 March 2010.
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- (30) *TrainMiC Convention*, Celje (Slovenia), 11-14 January 2009.
(*Awarded training content produced by the Portuguese TrainMiC team*)
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- (29) *2nd AcadeMiC Summer School on Education in Metrology in Chemistry*, Promoted by the “European Commission Joint Research Centre”, Krakow (Poland), 23-26 June 2007.
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- (28) *METCHEM Meeting 2007 – Technical Committee Plenary Meeting*, IPQ – Caparica (Portugal), 8-9 February 2007.
- (27) *Debate: Incertezas em Análise Química*, RELACRE – Lisbon (Portugal), 7 November 2006.
- (26) *6th European Pesticide Residues Workshop*, Corfu (Greece), 21-25 May 2006.
- (25) *AcadeMiC - Summer School on Education in Metrology in Chemistry*, Promoted by the “European Commission Joint Research Centre”; Rogaska Slatina (Slovenia), 6-9 de July de 2005.
(*Signatory of the “Rogaška declaration” related to teaching Metrology in Chemistry at Universities*)
- (24) *1º Conferência Nacional da Sociedade Portuguesa de Metrologia – “Medir Mais e Melhor”*, Lisbon (Portugal), 28-29 November 2005.
- (23) *Analítica 2005*, Coimbra (Portugal), 27 e 28 October 2005.
- (22) *Debate: Incertezas em Análise Química*, RELACRE – Lisbon (Portugal), 18 October 2005.
- (21) *1º Encontro Nacional da Sociedade Portuguesa de Metrologia*, Caparica (Portugal), 30 November 2004.
- (20) *Euroanalysis XIII*, Salamanca (Spain), 5-10 September 2004.
- (19) *5th European Pesticide Residues Workshop*, Stockholm (Sweden), 13-16 June 2004.
- (18) *Analítica 2003 – 3º Encontro de Química Analítica*, Oporto (Portugal), 18-19 November 2003.
- (17) *Economics Issues of Mediterranean Laboratories*, Lisbon (Portugal), 12 November 2002.
- (16) *6º Seminário Relacre – Factores de Competitividade dos Laboratórios*, Lisbon (Portugal), 11-12 November 2002.
- (15) *4th European Pesticide Residues Workshop*, Rome (Italy), 28-31 May 2002.
- (14) *Analítica 2001 - 3º Encontro Nacional de Química Analítica*, ISEL (Lisbon), 8-9 November 2001.
- (13) *Eurolab/Eurachem Workshop on Sampling*, Lisbon (Portugal) 5-6 November 2001.
(*Chair of “Statistical Tools for all Sampling Purposes” session*)
- (12) *1º Congresso Ibero-Americano de Laboratórios*, Lisbon (Portugal), 11-12 October 2001.
- (11) *First Joint Meeting of the Analytical Division of American Chemical Society and Federation of European Chemical Societies on Education in Analytical Chemistry*, Cordoba (Spain), 14-15 September 2001.
- (10) *5º Encontro de Química dos Alimentos da Sociedade Portuguesa de Química*, Oporto (Portugal), 8-11 May 2001.
- (9) *Euroanalysis XI*, Lisbon (Portugal), 3-9 September 2000.
(*Participation financed by Elsevier Science B.V.*)
- (8) *3rd European Pesticide Residues Workshop*, York (England), 3-5 July 2000.
(*Participation financed by FCT (Fundo de Apoio à Comunidade Científica)*)
- (7) *Identificação de Acções que Melhorem a Infra-estrutura Metrológica em Química em Espanha, Itália, Irlanda e Portugal*, Sesimbra (Portugal), 15-16 June 1998.
- (6) *XI Encontro Galego Português de Química*, Ferrol (Spain), 26-28 November 1997.
- (5) *1st Euroconference on Environmental Analytical Chemistry*, Neusiedl am See (Austria), 11-17 October 1997.
(*Participation financed by the programme “Training and Mobility of Researchers”*)
- (4) *Choix de Solvants pour l’Extraction, la Purification et l’Analyse de Résidus de Pesticides*, Angers (France), 6-9 October 1997.
- (3) *Measurement Uncertainty in Chemical Analysis - Current Practice and Future Directions*, Berlin (Germany), 29-30 September 1997.
- (2) *EUCO-CC2 Second European Conference on Computational Chemistry*, UL – Lisbon (Portugal), 2-6 September 1997.
(*Participation financed by the European Union*)
- (1) *XV Encontro Nacional da Sociedade Portuguesa de Química*, UA – Aveiro (Portugal), 1996.

10. Communications

10.1. Invited communications (I56 to I1):

- I56 – R. J. N. Bettencourt da Silva, *Quality in Chemical Analysis – The key to the reproducibility crisis*, *Analítica 2020* (Keynote), (Online) 27-28 October 2020.
- I55 – R. J. N. Bettencourt da Silva, *Examinologia em Química – Relevâncias e desafios*, *1º Encontro Internacional de Metrologia e Examinologia em Química*, (Online) 22 e 23 Outubro 2020.
- I54 – R. J. N. Bettencourt da Silva, *Teaching Metrology and Examinology in Chemistry at the University*, *e-Eurachem WS – Quality assurance for analytical laboratories in the university curriculum*, (Online), 14-15 July 2020. (MDPI Proceedings)
- I53 – R. J. N. Bettencourt da Silva, *Validação e Incerteza de Análises Qualitativas: Princípios e (Bons e Maus) Exemplos*, *3º Webinar ForMEQ*, (Online), 8 July 2020.
- I52 – L. B. Gomes, V. Morgado, R. J. N. Bettencourt da Silva, C. Palma, *Presence of Microplastics in Potential Portuguese Areas for Aquaculture: AQUIMAR Project Data*, *Workshop de Tecnologias Marinhas – 2019*, Estoril (Portugal), 3–5 December 2019.

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I51 – R. J. N. Bettencourt da Silva, Top-down uncertainty evaluations – Difficulties and solutions, Eurachem/Eurolab Workshop – Uncertainty from sampling and analysis for accredited laboratories, Berlin (Germany), 19–20 November 2019.

I50 – R. J. N. Bettencourt da Silva, F. Lourenço, D. B. Hibbert, Multivariate and correlated acceptance limits for conformity assessment, Eurachem/Eurolab Workshop – Uncertainty from sampling and analysis for accredited laboratories, Berlin (Germany), 19–20 November 2019.

I49 – I. Kuselman, F. R. Pennecchi, R. J. N. Bettencourt da Silva, D. B. Hibbert, Shades of grey in conformity assessment due to measurement uncertainty, Eurachem/Eurolab Workshop – Uncertainty from sampling and analysis for accredited laboratories, Berlin (Germany), 19–20 November 2019.

I48 – M. F. G. F. C. Camões, B. Anes, C. Oliveira, R. J. N. Bettencourt da Silva, A uniphied pH scale for all solvents, Ciências Research Day 2019, Lisboa (Portugal), 30 October 2019.

I47 – A. J. Nunes, P. Paixão, J. Proença, J. Narciso, S. Luz, R. J. N. Bettencourt da Silva, Improving the reliability of indirect and direct doping control, Ciências Research Day 2019, Lisboa (Portugal), 30 October 2019.

I46 – R. J. N. Bettencourt da Silva, Variação da incerteza com a concentração, Workshop RELACRE – Quantificação da Incerteza de Medição em Ensaios Químicos e Físico-Químicos: Perspetivas de Aplicação, Lisboa (Portugal), 10 October 2019.

I45 – I. Kuselman, F. Pennecchi, R. J. N. Bettencourt da Silva, D. B. Hibbert, How many shades of gray are in conformity assessment due to measurement uncertainty?, IV International Scientific and Technical Conference – Metrology of Physicochemical Measurements, Suzdal (Russia), 17–19 September 2019.

I44 – C. Palma, V. Morgado, R. J. N. Bettencourt da Silva, Modelling the variation of measurement uncertainty with the measured value from proficiency test results, PT Conf 2019 – International Proficiency Testing Conference, Oradea (Romania), 10–13 September 2019.

I43 – R. J. N. Bettencourt da Silva, Extracting more information from research in chemistry, 4th Meeting of the CQUL – Chemistry: Sharing the future, Lisbon (Portugal), 16–19 July 2019.

I42 – R. J. N. Bettencourt da Silva, Traceability and uncertainty of qualitative target and non-target Analysis, Eurachem Workshop “Validation of targeted and non-targeted methods of analysis”, Tartu (Estonia), 20–21 May 2019.

I41 – I. Kuselman, F. Pennecchi, R. J. N. Bettencourt da Silva, D. B. Hibbert, E. Anchutina, Risks in Conformity Assessment of a PtRh Alloy due to Measurement Uncertainty, Isranalytica 2019, Tel Aviv (Israel), 22–23 January 2019.

I40 – F. Pennecchi, I. Kuselman, R. J. N. Bettencourt da Silva, D. B. Hibbert, Evaluation of risks in conformity assessment of multicomponent materials or objects, Isranalytica 2019, Tel Aviv (Israel), 22–23 January 2019.

I39 – R. J. N. Bettencourt da Silva, C. Borges, C. Palma, Evaluation and optimisation of estuarine sampling uncertainty, Isranalytica 2019, Tel Aviv (Israel), 22–23 January 2019.

I38 – R. J. N. Bettencourt da Silva, A. Williams, Setting data requirements, Pre Conference Satellite Event – Isranalytica 2019, Quality of Test Results for Conformity Assessment of a Chemical Composition: What is Good and What is Bad?, Ramat Gan (Israel), 21 January 2019.

I37 – R. J. N. Bettencourt da Silva, Tutorial (1h): Avaliação “top-down” da incerteza de medição com ponderação da correção de efeitos sistemáticos, CONFMET 2018 – Conferência Nacional da SPMET – Em constante evolução o Sistema Internacional de Unidades, Caparica (Portugal), 28–29 November 2018.

I36 – R. J. N. Bettencourt da Silva, A importância da incerteza nos resultados, Seminário: A Importância da Qualidade nas Instituições, Aveiro (Portugal), 19 September 2018.

I35 – I. Kuselman, F. Pennecchi, R. J. N. Bettencourt da Silva, B. Hibbert, Risks of a false decision on conformity of a multicomponent material and quality of chemical analytical results, Eurachem Scientific Workshop – Data – Quality, Analysis and Integrity, Dublin (Ireland), 14–15 May 2018.

I34 – R. J. N. Bettencourt da Silva, A. Williams, Setting data requirements, Eurachem Scientific Workshop – Data – Quality, Analysis and Integrity, Dublin (Ireland), 14–15 May 2018.

I33 – R. J. N. Bettencourt da Silva, C. Palma, Measurement uncertainty evaluation based on proficiency test results: Algorithms and limitations, 6th International Proficiency Testing Conference, Cluj Napoca (Romania), 4–6 October 2017.

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- I32 – R. J. N. Bettencourt da Silva, Traceability and uncertainty in qualitative analysis, Eurachem Workshop: Uncertainty in Qualitative and Quantitative Analysis, Nicosia (Cyprus), 29–30 May 2017.
- I31 – R. J. N. Bettencourt da Silva, Setting and Using Target Uncertainty in Chemical Measurement, Pre-conference International Workshop – Validation of Test Methods, Human Errors and Measurement Uncertainty of Results, Tel Aviv (Israel), 23 January 2017.
- I30 – R. J. N. Bettencourt da Silva, Qualidade e Comparabilidade dos resultados de medição, Workshop Qualidade dos Resultados de Medição, Caparica (Portugal), 27 October 2016.
- I29 – R. J. N. Bettencourt da Silva, Incerteza da Medição em Química (5 h), Workshop: Estimativa de incerteza visando validação de métodos analíticos, Instituto Biológico, São Paulo (Brasil), 19 October 2016.
- I28 – R. J. N. Bettencourt da Silva, A Democratização da Metrologia, Dia aberto IPQ – Dia Mundial da Metrologia, Caparica (Portugal), 20 May 2016.
- I27 – R. J. N. Bettencourt da Silva, Definição e uso de uma incerteza alvo/incerteza máxima admissível, Workshop “Incertezas em Ensaio Físico-Químicos: Determinação, Validação e Uso da Incerteza”, Lisbon (Portugal), 25 November 2015.
- I26 – R. J. N. Bettencourt da Silva, Abordagem “passo a passo”: Dificuldades e omissões da Norma ISO 8466 para calibrações pelo método dos mínimos quadrados, Workshop “Incertezas em Ensaio Físico-Químicos: Determinação, Validação e Uso da Incerteza”, Lisbon (Portugal), 25 November 2015.
- I25 – R. J. N. Bettencourt da Silva, Abordagem EURACHEM: Avaliação da incerteza da recuperação média de analito estimada através da fortificação de diferentes amostras com analito nativo, Workshop “Incertezas em Ensaio Físico-Químicos: Determinação, Validação e Uso da Incerteza”, Lisbon (Portugal), 25 November 2015.
- I24 – R. J. N. Bettencourt da Silva, Relevance and approaches for the evaluation of the measurement uncertainty, Marine Chemistry Working Group (MCWG) of the International Council for the Exploration of the Sea (ICES), Lisbon (Portugal), 3 March 2015.
- I23 – R. J. N. Bettencourt da Silva, Research in Metrology and Examinology in Chemistry, CQE Young Researchers Day, Lisbon (Portugal), 1 December 2014.
- I22 – R. J. N. Bettencourt da Silva, Definição e uso da incerteza alvo em ensaios químicos, Workshop “Avaliação da Incerteza em Ensaio Químicos – Simplificar adequando ao uso”, Oeiras (Portugal), 27 November 2014.
- I21 – R. J. N. Bettencourt da Silva, Metrology in Chemistry: Better measuring to known more!, ChemForum, Lisbon (Portugal), 12 November 2014.
- I20 – B. Anes, R. J. N. Bettencourt da Silva, M. Filomena G. F. C. Camões, Compatibility of mean activity coefficients estimated experimentally and by Pitzer equations, Workshop “Metrology for ocean salinity and acidity”, Berlin (Germany), 16–17 June 2014.
- I19 – R. J. N. Bettencourt da Silva, Setting the measurement requirement, Eurachem Workshop on Quality in Analytical Measurements, Lisbon, 19–21 May 2014.
- I18 – R. J. N. Bettencourt da Silva, Analytical performance models for measurement uncertainty optimization, Workshop “SPQ – Analítica 2014”, Coimbra (Portugal), 14–15 April 2014.
- I17 – R. J. N. Bettencourt da Silva, A importância da Metrologia Química no mercado e no meio académico, Workshop “Metrologia em Química e Qualidade – Impactos da Metrologia em Química na Academia e no Mercado”, Workshop of Former UNESP students association, Instituto de Biociências, Letras e Ciências Exatas, São José do Rio Preto (Brazil), 22 November 2013.
- I16 – R. J. N. Bettencourt da Silva, A importância da Metrologia Química no mercado e no meio académico, 1º Ciclo de Palestras do Centro de Ciências Agrárias da Universidade Federal de São Carlos (UFSCar), São Carlos (Brazil), 18 November 2013.
- I15 – R. J. N. Bettencourt da Silva, Alternative approaches for the evaluation of the uncertainty of food measurements (Key lecture), Joint IMEKO TC8, TC23 and TC24 Symposium on Traceability in Chemical, Food and Nutrition Measurements, Lisbon (Portugal), 22–25 September 2013.
- I14 – R. J. N. Bettencourt da Silva, D. Silveira, M. F. Camões, P. A. S. Salgueiro, Internal Quality Control for qualitative tests: Identification of the active substance in tear gas weapons, Key Challenges in Internal Quality Control, Berlin (Germany), 10–11 October 2012.

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I13 – R. J. N. Bettencourt da Silva, Translating customers' needs to method validation requirements the link to performance criteria, Eurachem/CITAC workshop "Validation, Traceability and Measurement Uncertainty – Challenges for the 21st Century's analysts", Berlin (Germany), May 2012.

I12 – R. J. N. Bettencourt da Silva, Uncertainty and metrological traceability, Eurachem/CITAC workshop "Recent developments in measurement uncertainty", Lisbon (Portugal), June 2011.

I11 – R. J. N. Bettencourt da Silva, Como varia a incerteza com a concentração? – Abordagens Simplificadas, Workshop "Debate: Incertezas em Análise Química", Lisbon (Portugal), November 2006.

I10 – R. J. N. Bettencourt da Silva, Guide to the Evaluation of Measurement Uncertainty for Quantitative Test Results – Apresentação do Guia da Eurolab, Workshop "Debate: Incertezas em Análise Química", Lisbon (Portugal), November 2006.

I9 – R. J. N. Bettencourt da Silva, Novas Metodologias de Cálculo de Incertezas em Análise Química, Workshop "Incertezas em Análise Química", Lisbon (Portugal), October 2005.

I8 – R. J. N. Bettencourt da Silva, Júlia R. Santos, M. Filomena G. F. C. Camões, Routine Analysis: Management of costs & reliability, Euroanalysis XIII, Salamanca (Spain), September 2004.

I7 – R. J. N. Bettencourt da Silva, J. R. Santos, M. F. G. F. C. Camões, Evaluation of Method Recovery in the Analysis of Pesticide Residues in Oranges, 5th European Pesticide Residues Workshop, Stockholm (Sweden), June 2004.

I6 – L. Alder, A. Andersson, R. J. N. Bettencourt da Silva, A. Di Muccio, G. Jamet, A. de Kok, S. Reynolds, A. Valverde-Garcia, Measurement Uncertainty in Pesticide Residue Analysis – Concepts used in EU Member States, 5th European Pesticide Residues Workshop, Stockholm (Sweden), June 2004.

I5 – R. J. N. Bettencourt da Silva, Approaches for the Quantification of the Measurement Uncertainty, 5th European Pesticide Residue Workshop, Stockholm (Sweden), June 2004.

I4 – R. J. N. Bettencourt da Silva, J. R. Santos, M. F. G. F. C. Camões, Uncertainty Estimates for Routine Instrumental Analysis, Workshop on Quality Assurance in Testing Laboratories, Nicosia (Cyprus), 14–15 May 2002.

I3 – J. R. Santos, R. J. N. Bettencourt da Silva, Problemática da Análise de Resíduos de Pesticidas em Frutos e Hortícolas – Abordagem para a Validação Interna de Métodos Multi-Resíduos e Cálculo de Incertezas, 2º Congresso Ibérico de Laboratórios, Madrid (Spain), 16–17 October 2000.

I2 – R. J. N. Bettencourt da Silva, H. Figueiredo, J. R. Santos, M. F. G. F. C. Camões, Estimation of Analytical Method Recovery Performance Aiming at the Expression of Results with Reliable Uncertainty – Determination of pesticides in apples, Euroanalysis XI, Lisbon (Portugal), September 2000.

I1 – J. Seabra e Barros, R. J. N. Bettencourt da Silva, Z. Melo, M. J. S. Nunes, M. A. Trancoso, M. J. Cruz, M. T. Vilhena, Análise Química de Resíduos e Efluentes Industriais – Parte 1 – Determinação da Composição Química de Resíduos Sólidos, Seminário "Gestão e Valorização dos Resíduos e Efluentes Industriais", Lisboa (Portugal), 1996.

10.2. Oral communications (O71 to O1):

O71 – V. Morgado, C. Palma, R. J. N. Bettencourt da Silva, Avaliação "bottom-up" da incerteza de medições complexas pelo método de Monte Carlo, IDEIA 2021 – Innovation in Maritime Operations: Aligning with Academia and Industry, (Online) 26-27 January 2021.

O70 – A. C. Rocha, C. Palma, R. J. N. Bettencourt da Silva, Inovação nos critérios e objetividade na identificação da origem de derrames de produtos petrolíferos no meio marinho, IDEIA 2021 – Innovation in Maritime Operations: Aligning with Academia and Industry, (Online) 26-27 January 2021.

O69 – C. Borges, C. Palma, R. J. N. Bettencourt da Silva, Vast Sea Monitor: uma ferramenta de modelação e otimização da incerteza da composição de sistemas marinhos vastos, IDEIA 2021 – Innovation in Maritime Operations: Aligning with Academia and Industry, (Online) 26-27 January 2021.

O68 – V. Morgado, C. Palma, R. J. N. Bettencourt da Silva, Innovative user-friendly tool for the reliable and fast identification of microplastics by infrared spectroscopy: Increasing analytical competitiveness, IDEIA 2021 – Innovation in Maritime Operations: Aligning with Academia and Industry, (Online) 26-27 January 2021.

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O67 – A. C. Rocha, C. Palma, R. J. N. Bettencourt da Silva, Alternativa de comparação de razões de diagnóstico para a identificação da origem de derrames de produtos petrolíferos, 6º Jornadas de Engenharia Hidrográfica e 1º Jornadas Luso-Espanholas de Hidrografia , (Online) 3-5 November 2020.

O66 – C. Borges, C. Palma, R. J. N. Bettencourt da Silva, Monitorização química de sistemas marinhos – Avaliação do impacto da amostragem na incerteza de resultados por simulação de Monte Carlo de dados georreferenciados, 6º Jornadas de Engenharia Hidrográfica e 1º Jornadas Luso-Espanholas de Hidrografia , (Online) 3-5 November 2020.

O65 – A. C. Rocha, C. Palma, R. J. N. Bettencourt da Silva, Statistically Sound Identification of Oil Spills Origin: Simulation of Non-Normal Diagnostic Ratios by the Monte Carlo Method, Analítica 2020, (Online) 27-28 October 2020. (Prize: Best oral communication)

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