Curriculum Vitae

Eduardo Conde-Sousa

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1. Personal data

Full Name: Eduardo Conde Silva de Sousa
Birth date: 23.10.1979
Birth place: Lanhelas, Caminha, Portugal
Residence: Porto - Portugal
Citizenship: Portuguese

2. Current situation

Since 04/2018 Bioimage Analyst @ INEB – Instituto Nacional de Engenharia Biomédica, University of Porto, Portugal

3. External Links

Personal webpage: https://econdesousa.github.io
Google Scholar: https://scholar.google.com/citations?hl=en&user=xi0xi2AAAAAJ
ORCID :   https://orcid.org/0000-0002-6591-5063
SCOPUS: https://www.scopus.com/authid/detail.uri?authorId=55233686200

4. Profile

I´m holding three degrees in Mathematics and over the years I had developed very good programming skills on several environments and languages such as MATLAB, R, Python, ImageJ Macro, or Linux Shell Scripting.
I have a particular interest on the development and application of software for mathematical modeling, simulation and data analysis for the study of biological processes, from bioimage analysis, to neurosciences, population genetics, genomics and metabarcoding.
I'm also interested in lecturing at advanced courses and/or workshops.

5. Academic degrees

2014   PhD in Applied Mathematics
               Faculty of Sciences of University of Porto (FCUP), Porto, Portugal
               Thesis title: Computational Models for Information Storage in Spiking Neurons
               Supervisor: Dr. Paulo Aguiar (Institute for Biomedical Engineering, INEB, and Center of Mathematics of University of Porto, CMUP)
               Final classification: Approved with Distinction (maximum grade)

2004	MSc in Mathematics – Foundations and Applications
	Faculty of Sciences of University of Porto (FCUP), Porto, Portugal
	Thesis title: Grupóides e Sincronização em Sistemas de Células Acopladas (in Portuguese)
	Supervisor: Prof. Ana Paula Dias (Department of Mathematics, FCUP, and Center of Mathematics of University of Porto, CMUP)
	Final classification: Very Good (maximum grade)

2002	BSc in Mathematics – Educational branch
	Faculty of Sciences of University of Porto (FCUP), Porto, Portugal
	Final classification: 16 out of 20

6. Work experience

04/2018 –	Bioimage Analyst at INEB – Instituto Nacional de Engenharia Biomédica, University of Porto, Portugal
02/ 2016 – 03/2018	Post-Doc fellow at Centre of Molecular and Environmental Biology (CBMA), Department of Biology, University of Minho, Braga, Portugal
12/ 2014 – 10/2015	Post-Doc fellow at Research Center in Biodiversity and Genetic Resources (CIBIO-inBIO)
09/2011	Teaching assistant at summer school EVMAT 2011, Center of Mathematics of University of Porto (CMUP), Portugal
2008 – 2013	Collaborator in Multimedia Centre of Porto Editora (publishing house): Didactical Content Development and Revision
09/2004 – 08/2010	High school teacher of Mathematics (from 7th to 12th grades) in Portugal
09/2003 – 08/2004	Teacher of Mathematics in Polytechnic Institute of Bragança in Portugal
09/2001 – 08/2003	High school teacher of Mathematics (from 10th to 12th grades) in Portugal

7. University scholarships and grants

| 2019 | Travel and accommodation grant to attend the Training School TS11 for BioImage Analysts and the Open Symposium/Showcase on Bioimage Analysis and Open Tools, Feb 1st – 8th 2019, Université du Luxembourg, Luxembourg |

12/2014 – 09/2015	Post-doc grant in the R&D Project with reference PTDC/CVT/117851/2010.
09/2010 – 10/2014	PhD scholarship (reference SFRH/BD/65633/2009) from Portuguese Foundation for Science and Technology, financed by POPH - QREN.
2012	Travel and accommodation grant to attend the Edinburgh Summer School in Integrative Computational Neuroscience, August 26th – September 2nd 2012, Institute for Adaptive and Neural Computation, School of Informatics, University of Edinburgh, Scotland

8. Participation in projects

8.1. Principal Investigator

06/2018 – 05/2021	"eCSI-barcode – Efficient computational solutions for integrated DNA barcoding, metabarcoding and associated high-throughput sequencing data analysis" ref: PTDC/BIA-OUT/29626/2017 Institutions: University of Minho with two centers (CBMA and ALGORITMI) and IPATIMUP. *Between the project proposal and the project approvals' date, I moved to INEB and the former co-PI and I permuted our administrative roles in the project.

8.2. Team Member

10/2018 – 09/2022	COMULIS: Correlated Multimodal Imaging in Life Sciences, ref: CA17121
10/2018 – 09/2021	NIS-DNA: Early detection and monitoring of non-indigenous species (NIS) in coastal ecosystems based on high-throughput sequencing tools, ref: PTDC/BIA-BMA/29754/2017
09/18 – 08/2021	From Portugal back to Africa: uncovering the african roots of present-day Portuguese, ref: PTDC/SOC-ANT/30316/2017
05/2017 – 04/2020	PPBI: Plataforma Portuguesa de Bioimagem ref: PINFRA/22122/2016
05/2016 – 04/2020	NEUBIAS: A new Network of European BioImage Analysts to Advance life Science Imaging, ref:CA15124
12/2014 – 09/2015	"Assessing The Whole-Genome Structure and Variation of the Tropical Adapted Zebu Cattle (Bos indicus) using Dense SNP Maps.", ref: PTDC/CVT/117851/2010

9. Computer skills and competences

Very good programming skills for languages such as ImageJ Macro, MATLAB, R, Python, NEURON simulation environment, Linux Shell Scripting

Very good working skills for bioimage analysis software such as ImageJ, Ilastik, or Cell Profiller

Good programming skills for languages such as C++ and Qt

Good command skills for several technical software, e.g. VCFtools, BCFtools, SAMtools, PLINK, BLAST, mothur, ms, msHOT, bwa, etc.

10. Commissions and Working Groups

Co-chair of a sessions at the European Society of Digital and Integrative Pathology (ESDIP) workshop, 24 November 2020

Invited external consultant of GHEP-ISFG's working group "Segregation XSTRs"

Invited to the "Cambridge Hackathon" of the BigNeuron Project. The BigNeuron Project is an international consortium aiming to define and advance the state-of-the-art of single neuron reconstruction, supported by the Human Brain Project; the Wellcome Trust (UK), the Allen Institute for Brain Science (USA), the International Neuroinformatics Coordinating Facility; or the Beijing University of Technology (China).

11. Lecturer at Advanced Courses & Workshops

Organizer and Lecturer of Batch Analysis and Macro Development in ImageJ/Fiji: going beyond the basics, 9 - 15 December 2020, i3S, Porto, Portugal

Organizer and Lecturer of Batch Analysis and Macro Development in ImageJ/Fiji: going beyond the basics, 13 - 15 November 2019, i3S, Porto, Portugal

Lecturer at Introduction to Digital BioImage Analysis, 24 - 27 September 2019, i3S, Porto, Portugal

Lecturer at 6th NEUBIAS Training School for Early Career Investigators (TS12), 14-17 October, 2019, INEC-TEC, Porto , Portugal

Teaching Assistant at 2nd UPTEC's Future of Computing summer school: Coding my first brain – "Hello Brain" in neuromorphic computing, 01-05 July 2019, UPTEC, Porto, Portugal

Lecturer at High-throughput Screening and Image Analysis for Biosciences 2019, 27-31 May, 2019, i3S, Porto, Portugal

Organizer of BIAclub (BioImage Analysis Club) @ Instituto de Investigação e Inovação em Saúde (i3S), Porto, Portugal

Organizer and Lecturer of the Workshop (18 hours) "Basic Concepts of Programming in R", 16-31 January, 2017, Centre of Molecular and Environmental Biology (CBMA), Department of Biology, University of Minho, Braga, Portugal

Lecturer of the Workshop (30 hours) "Introduction to Scientific Programming with MATLAB", 22-30 April, 2016; State University of Rio de Janeiro (UERJ), Rio de Janeiro, Brazil

12. Publications

12.1. Publications in peer reviewed journals

15. Neto, L., Pinto, N., Proença, A., Amorim, A., **Conde-Sousa, E.**, 4SpecID: Reference DNA Libraries Auditing and Annotation System for Forensic Applications (2021) Genes, 12, 61.; DOI: 10.3390/genes12010061

14. La Barbera, D., Polónia, A., Roitero, K., **Conde-Sousa , E.**, Della Mea, V. Detection of HER2 from Haematoxylin-Eosin Slides Through a Cascade of Deep Learning Classifiers via Multi-Instance Learning (2020) J. Imaging, 6(9), 82; DOI: 10.3390/jimaging6090082

13. Vieira, D., Esteves,S., Santiago,C **Conde-Sousa, E.**, Fernandes, T., Pais, C., Soares, P., Franco-Duarte, R. Population analysis and evolution of Saccharomyces cerevisiae mitogenomes (2020) Microorganisms, 8(7), 1001; DOI: 10.3390/microorganisms8071001

12. **Conde-Sousa E.**, Pinto N., Amorim A., Reference DNA databases for forensic species identification: Auditing algorithms (2019) Forensic Science International: Genetics Supplement Series, 7 (1), pp. 564-566. doi: 10.1016/j.fsigss.2019.10.091

11. Antão-Sousa S., **Conde-Sousa E.**, Gusmão L., Amorim A., Pinto N., Underestimation and misclassification of mutations at X chromosome STRs depend on population's allelic profile (2019) Forensic Science International: Genetics Supplement Series, 7 (1), pp. 718-720. doi: 10.1016/j.fsigss.2019.10.150

10. Barros D., **Conde-Sousa E.**, Gonçalves A.M., Han W.M., García A.J., Amaral I.F., Pêgo A.P., Engineering hydrogels with affinity-bound laminin as 3D neural stem cell culture systems (2019) Biomaterials Science, 7 (12), pp. 5338-5349. Doi: 10.1039/c9bm00348g

9. Rito T., Vieira D., Silva M., **Conde-Sousa E.**, Pereira L., Mellars P., Richards M.B., Soares P., A dispersal of Homo sapiens from southern to eastern Africa immediately preceded the out-of-Africa migration (2019) Scientific Reports, 9 (1), 4728, doi: 10.1038/s41598-019-41176-3

8. Pinto N., Simões R., Amorim A., **Conde-Sousa E.**, Optimizing the information increase through the addition of relatives and genetic markers in identification and kinship cases (2019) Forensic Science International: Genetics, 40, pp. 210-218. doi: 10.1016/j.fsigen.2019.02.019

7. Barros D., Parreira P., Furtado J., Ferreira-da-Silva F., **Conde-Sousa E.**, García A.J., Martins M.C.L.,   Amaral I.F.,   Pêgo, A.P., An affinity-based approach to engineer laminin-

presenting cell instructive microenvironments, Biomaterials, Vol 192, 2019, doi:10.1016/j.biomaterials.2018.10.039.

6. Machado P., Gusmão L., **Conde-Sousa E.**, Pinto N., The influence of the different mutation models in kinship evaluation, Forensic Science International: Genetics Supplement Series http://dx.doi.org/10.1016/j.fsigss.2017.09.093

5. Goncalves J., **Conde-Sousa E.**, Egeland T., Amorim A., Pinto N., Key individuals for discerning pedigrees belonging to the same autosomal kinship class, Forensic Science International: Genetics, 19 March 2017, doi: 10.1016/j.fsigen.2017.03.018

4. Olivieri A., Sidore C., Achilli A., Angius A., Posth C., Furtwängler A., Brandini S., Rosario Capodiferro M., Gandini F., Zoledziewska M., Pitzalis M., Maschio A., Busonero F., Lai L., Skeates R., Giuseppina Gradoli M., Beckett J., Marongiu M., Mazzarello V., Marongiu P., Rubino S., Rito T., Macaulay V., Semino O., Pala M., Abecasis G.R., Schlessinger D., **Conde-Sousa E.**, Soares P., Richards M.B., Cucca F., Torroni A., Mitogenome diversity in Sardinians: a genetic window onto an island's past, Mol Biol Evol. 2017 Feb 8. doi: 10.1093/molbev/msx082.

3. **Conde-Sousa E.**, Szücs P., Peng H., Aguiar P., N3DFix: an Algorithm for Automatic Removal of Swelling Artifacts in Neuronal Reconstructions, Neuroinformatics, 2016 doi:10.1007/s12021-016-9308-7

2. **Conde-Sousa E.**, Aguiar P., A working memory model for serial order that stores information in the intrinsic excitability properties of neurons, Journal of Computational Neuroscience, Volume 35, Issue 2, October 2013, pp 187-199

1. Pinto N., Magalhães M., **Conde-Sousa E.**, Gomes C., Pereira R., Alves C., Gusmão L., Amorim A., Assessing paternities with inconclusive STR results: the suitability of bi-allelic markers, Forensic Science International: Genetics, Volume 7, Issue 1, January 2013, Pages 16-21.

12.2. Publications in conference proceedings

Conde-Sousa E., Aguiar P., Conversion from spatial patterns of activity to sequences of neuronal activations using gate interneurons, BMC Neuroscience, July 2013, 14(Suppl.1)

12.3. Other Publications

Conde-Sousa E., Aguiar P., Detailed mathematical models in neurobiology – Storing information in membrane conductances dynamics, CIM Bulletin, 2012, 31, 19–26.

12.4. Submitted

Conde-Sousa E., Vale J., Feng M., Xu K., Wang Y., Della Mea V., La Barbera D., Montahaei E., Aresta G., Araújo T., Aguiar P., Eloy C., Polónia A., HEROHE Challenge: assessing HER2 status in breast cancer without immunohistochemistry or in situ hybridization (Submitted)

13. Communications in scientific meetings

13.1. Invited speaker in scientific meetings

"The HEROHE challenge", European Society of Digital and Integrative Pathology (ESDIP) workshop, 24 November 2020

"Computational Neuroscience", Human Neurobehavioral Laboratory Workshop: Research Methods in Neuroscience, December 2014, Catholic University of Porto, Portugal

"A working memory model capable of storing pattern sequences without synaptic plasticity", Mathematical Neuroscience Workshop, April 2012, Center of Mathematics of University of Porto (CMUP), Portugal

13.2. Oral communications in scientific meetings
(Presented by*)

Pinto N., **Conde-Sousa E.**, Chen S., Pérez-Pardal L., Goyache F., Beja-Pereira A.*, Computational tools to exploit cattle exomes. 34th Conference of International Society of Animal Genetics, Xi'an, China, July, 2014.

13.3. Panel communications in scientific meetings

Guimarães S.C., Majumdar A., Pombinho A., **Conde-Sousa E.**, Pêgo A.P., The simpler, the better: Paving the way towards a high throughput screening platform for axonal pathology targeted therapies, i3S annual meeting, Povoa do Varzim, Portugal, November 28th-29th, 2019

Conde-Sousa E., Pinto N., Amorim A., Semi-automated Auditing and Annotation of Reference Databases of DNA Barcodes for species identification , 28th World Congress of the International Society for Forensic Genetics (ISFG), Prague, Czech Republic,2019

Antão-Sousa S., **Conde-Sousa E.**, Gusmão L., Amorim A., Pinto N., Underestimation and Misclassification of Mutations at X Chromosome STRs Depend on Population Allelic Profile, 28th World Congress of the International Society for Forensic Genetics (ISFG), Prague, Czech Republic,2019

Machado P., Gusmão L., **Conde-Sousa E.**, Pinto N., The influence of the different mutation models in kinship evaluation, 27th World Congress of the International Society for Forensic Genetics (ISFG), Seoul, South Korea, 2017

Gonçalves J., **Conde-Sousa E.**, Amorim A., Pinto N., How relevant can the mother be, 17th Portugaliæ Genetica, IPATIMUP/i3S, Porto, Portugal, March 17th - 18th, 2016

Conde-Sousa E., Szucs P., Aguiar P., N3DFix: An algorithm for automatic removal of swelling artifacts in neuronal 3D reconstructions, XIV Meeting of Portuguese Society for Neuroscience, Póvoa de Varzim, Portugal, June 4th - 5th, 2015

Sousa M., Luz L., Antal Z., **Conde-Sousa E**., Lima D., Szucs P., Aguiar P., Distinct patterns of synaptic integration in the dendrites of tonic spinal Lamina I neurons – experimental data and computer simulations, XIV Meeting of Portuguese Society for Neuroscience, Póvoa de Varzim, Portugal, June 4th - 5th, 2015

Sousa M., Antal Z., **Conde-Sousa E.**, Aguiar P., Szucs P., Distinct Patterns of Synaptic Integration in the Dendrites of Tonic Spinal Lamina I and Lateral Spinal Nucleus Neurons, IBRO Workshop 2014, Debrecen, Hungary, January 16th – 17th, 2014.

Conde-Sousa E., Aguiar P., Conversion from spatial patterns of activity to sequences of neuronal activations using gate interneurons, CNS 2013, Paris, France, July 13th – July 18th, 2013.

Conde-Sousa E., Aguiar P., A working memory model capable of storing sequences of patterns without using synaptic plasticity, 2nd Champalimaud Neuroscience Symposium, Lisbon, Portugal, September 30th – October 3rd, 2012.

Conde-Sousa E., Aguiar P., Storing information in membrane conductances dynamics - working memory without synaptic plasticity, 1st Champalimaud Neuroscience Symposium, Lisbon, Portugal, September 18th – September 21st, 2011.

14. Theses Supervisions

2019 – 2020   Rita Pacheco Fernandes
MSc in Bioinformatics and Computational Biology
Faculty of Sciences of University of Porto (FCUP), Porto, Portugal
Institution: INEB/i3S
Thesis title: 3D tracing of filament-like structures.
Supervisor: Eduardo Conde-Sousa, PhD, INEB – Porto, Portugal
Co-supervisor: Paulo Aguiar, PhD, INEB – Porto, Portugal
Co-supervisor: Mónica Sousa, PhD, IBMC – Porto, Portugal

2019 – 2020   Luís Manuel Pacheco Neto
MSc in Computer Science
University of Minho, Braga, Portugal
Institution: ALGORITMI
Thesis title: An efficient and accurate framework for large-scale sequences of DNA barcodes.
Supervisor: Alberto Proença, PhD, ALGORITMI – Braga, Portugal
Co-supervisor: Eduardo Conde-Sousa, PhD, INEB – Porto, Portugal

2017 – 2018   Priscilla Heberle Almeida
                   MSc in Forensic Genetics
                   Faculty of Sciences of University of Porto (FCUP), Porto, Portugal
                   Institution: IPATIMUP/i3S
                   Thesis title: X-chromosomal mapping – a family study for 10 short tandem repeat loci.
                   Supervisor: Nádia Pinto, PhD, IPATIMUP/i3S
                   Co-supervisor: Eduardo Conde-Sousa, PhD, INEB – Porto, Portugal

2016 – 2017   Raquel Sofia Miranda Simões
                   MSc in Bioinformatics, concluded (grade 19 out of 20)
                   School of Engineering, University of Minho, Braga, Portugal
                   Institution: School of Engineering, University of Minho
                   Thesis title: Distinguishing kinships beyond identity and paternity.
                   Supervisor: Eduardo Conde-Sousa, PhD, CBMA – Braga, Portugal
                   Co-supervisor: Nádia Pinto, PhD, IPATIMUP/i3S

2016 – 2017   Pedro Machado
                   MSc in Forensic Genetics, concluded (grade 20 out of 20)
                   Faculty of Sciences of University of Porto (FCUP), Porto, Portugal
                   Institution: IPATIMUP/i3S
                   Thesis title: The influence of mutation models in kinship likelihoods.
                   Supervisor: Nádia Pinto, PhD, IPATIMUP/i3S
                   Co-supervisor: Eduardo Conde-Sousa, PhD, CBMA – Braga, Portugal

2016 – 2017   Arti Bandhana
                   MSc in Mathematical Engineering, concluded (grade 16 out of 20)
                   Institution: IPATIMUP/i3S and Faculty of Sciences, University of Porto
                   Thesis title: Unravelling the genetic component of male infertility
                   Supervisor: Alexandra Lopes, PhD, IPATIMUP/i3S
                   Co-supervisor: Eduardo Conde-Sousa, PhD, CBMA – Braga, Portugal

15. Jury of Dissertations

Jury of the MSc in Bioinformatics, School of Engineering, University of Minho, Braga, Portugal. Dissertation title: Building a database of common genetic variation in the Portuguese population. Ana Raquel Ramos, December 5th, 2018.

Jury of the MSc in Bioinformatics, School of Engineering, University of Minho, Braga, Portugal. Dissertation title: Estimating recombination frequency throughout the human genome using a phylogenetic-based method. Raquel dos Santos Silva, November 29th, 2016.

Jury of the MSc in Biophysics and Bionanosystems, School of Sciences, University of Minho, Braga, Portugal. Dissertation title: Creation of databases of ageing-related drugs and statistical analysis and applied machine learning for the prioritization of potential lifespan-extension drugs. Diogo Gonçalves Barardo, August 11th, 2016.

16. Attended training courses

Training School TS11 for BioImage Analysts, Feb 1st –5th 2019, Université du Luxembourg, Luxembourg

Imaris training course for facility staff, July 3rd – 4th 2018, Instituto Gulbenkiian de Ciência, Oeiras, Portugal

Optical Microscopy Imaging for Biosciences, 2018 ed, April 9th-13th 2018, i3S - Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Portugal

Summer School in Advanced Scientific Computing, June 20th-23th 2016, Informatics Department, School of Engineering, University of Minho, Braga, Portugal

Introduction to Next-Generation Sequencing Data and Analysis, June 23th-26th 2015, CIBIO-inBIO, Vairão, Portugal

Edinburgh Summer School in Integrative Computational Neuroscience, August 26th – September 2nd 2012, Institute for Adaptive and Neural Computation, School of Informatics, University of Edinburgh, Scotland

First Portuguese Forum On Computational Biology, July 10th-12th 2008, Instituto Gulbenkian de Ciência, Oeiras, Portugal

Summer School on Mathematics in Biology and Medicine, September 2004, Instituto Gulbenkian de Ciência, Oeiras, Portugal

17. Language skills

17.1. Mother tongue

Portuguese

17.2. Other languages

Self-assessment; European level (Common European Framework of Reference (CEF) level: http://europass.cedefop.europa.eu/en/resources/european-language-levels-cefr)

Language	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C1	C1	C2
Spanish	C2	C2	C1	C1	C1
French	B1	B1	A1	A1	A1