António Miguel **de Jesus Domingues**

[Genomics] Data Scientist · Multi-omics

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Summary

Bioinformatician with more than 10 years experience in the analysis and integration of multi-omics datasets and a background in experimental biology. I enjoy experimenting with data visualization to communicate results effectively, and to automate data processes to deliver insights more efficiently. More recently, I have been dipping my toes in machine learning, and leading projects at the interface of biology, data science and software development.

Skills

Core competencies	Genomic data analysis, RNA-seq, small RNA-seq, ATAC-seq, Exosome sequencing, NGS, data science
Programming	R/Bioconductor, bash, Python, git, Cluster computing, Markdown, LaTeX, statistics, AWS, Machine Learning, Shiny
Operating systems	Linux Ubuntu, Windows, MacOS
Laboratory (outdated)	Cell culture, RNA extraction, DNA cloning, qPCR, animal tissue extraction, single-cell calcium imaging, FACS
Languages	Portuguese (Native speaker), English (Fluent), German (Conversational), French

Education

University of Leicester
Leicester, United Kingdom

PhD in Cell Physiology and Pharmacology — *2006 - 2009*

- Thesis title: Cloning and characterization of novel NMDA receptors splice variants in Glia

University of Aveiro
Aveiro, Portugal

MSc in Molecular Microbiology — *2002 - 2005*

- Thesis title: The role of N-methyl-D-aspartate receptor subunits in Aß induced toxicity
- Host institution: Center for Neuroscience and Cell Biology (CNC), Coimbra, Portugal

University of Aveiro
Aveiro, Portugal

BSc in Biology — *1997 - 2001*

- Semester project 1: Phytochelatin synthesis in Pisum sativum L. induced by zinc.
- Semester project 2: Identification of proteins that interact with protein phosphatase type 1 gamma subunit using the yeast two-hybrid approach.

Work Experience

Dewpoint Therapeutics GmbH
Dresden, Germany

Associate Principal Scientist (Data Science) — *March 2022 - Present*

- Lead the development of a Shiny application from requirements to CI/CD deployment in AWS with a team of DevOps and software developers.
- Biomarker discovery to drive R&D programs using conventional differential gene expression analysis and network based approaches.
- Evaluation of CROs for sequencing services.
- Prototyped explainable machine learning models for molecule prioritization.
- Evaluation and recommendation of Data Science products and Services.
- Supervision of a Data Science intern.
- Lead projects executed by external contractors.

Dewpoint Therapeutics GmbH
Dresden, Germany

Senior Scientist (Data Science) — *January 2021 - February 2022*

- Custom analysis of genomic data.
- Differential gene expression analysis for multiple disease programs (RNA-seq data).
- Development of proof of concept Shiny applications.
- Design RNA-seq experiments with R&D teams and liase with external CROs for their execution.
- Design and implementation of ETL pipelines.
- Development of an internal R package for the analysis of mass-spectrometry measurements.
- Prototyping of machine learning models.
- Leading several projects to set-up Data Science infrastructure in AWS (NF-Tower, Shiny server)
- Design of data ontologies for storage sample metadata.
- Evaluation and recommendation of Data Science products and Services.
- Supervision of a Data Science intern.
- Lead projects executed by external contractors.

Scientific Computing Facility (Scionics GmbH), MPI-CBG

Dresden, Germany

Bioinformatics Data Analyst

June 2019 - December 2020

- Custom analysis of genomic data.
- Integration of multi-omics data (Ribo-Seq and RNA-seq datasets).
- Pipeline development for mass-spectrometry data.
- Pipeline development for long read sequencing (PacBio) to detect genomic insertions.
- Differential gene expression analysis (RNA-seq data).
- Teaching of a data analysis and visualization course (R) highly rated by students.
- Implementation of conda environments in production to increase reproducibility of data analysis.

Institute of Molecular Biology

Mainz, Germany

Postdoctoral researcher / Bioinformatician

Dec. 2014 - May 2019

- Developed and implemented pipelines for small RNA analysis (piRNA, miRNA).
- Integrated and analyzed multiple -omics datasets (smRNA-seq, mRNA-seq, total RNA-seq, ATAC-seq).
- Developed scripts and tools for custom sequencing data analysis.
- Designed and advised on the design of figures and best visualization practices.
- Tested the suitability of new library preparation kits / methods for next-generation sequencing.
- Coordinated the installation of a Zebrafish Facility Management database. I ensured good communication between the IT support, the fish facility manager and the database developer.
- Internal group teaching of UNIX command-line usage and bash.

Biotechnology Center TUD (Biotec)

Dresden, Germany

Postdoctoral researcher / Bioinformatician

Oct. 2013 - Nov. 2014

- Built a pipeline for variant calling from exome sequencing data.
- Troubleshooting of sequencing issues.
- Advised users on NGS experimental design.
- Liaised with clinical staff and organized the collection and processing of clinical samples.
- Analysis of chromatin associated proteins (DamID-seq and ChIP-seq)
- Differential gene expression (RNA-seq data).
- T-cell receptor profiling.

Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG)

Dresden, Germany

Marie Curie Postdoctoral Fellow

Oct. 2009 - Aug. 2013

- Created new stable cell lines with tagged RNA-binding proteins.
- Prepared RNA samples for splice-junction arrays, RNA-seq and ChIP-seq.
- Analyzed the data of all experiments of my project.
- Collaborated with students and Postdoctoral researchers in conceiving and analyzing experiments.
- Trained doctoral students.

Center for Neuroscience and Cell Biology

Coimbra, Portugal

Cell culture technician

May 2005 - Jan. 2006

- Maintained mammalian cell lines and plated them for experiments according the requests of users.
- Ordering and budgeting of cell culture reagents
- Preparation of cell culture media.
- Teaching aseptic cell culture techniques and best practices to students.

Open source contributions

Package maintainer

Bioconductor

GeneOverlap

May. 2020 - Present

- Fixed bugs to keep the package as part of Biocondutor.
- User support.

Teaching and mentoring

Dewpoint Therapeutics

Dresden, Germany

Machine learning intern

2021

- Supervised an undergraduate student developing machine learning models.
- Fully remote supervision.

IMB alumni

Dresden, Germany

IMB mentoring program

2021 - present

- Mentoring of a PhD student at one of my former places of employment.

Max Planck Institute of Molecular Cell Biology and Genetics *Dresden, Germany*

Data Analysis and Visualization with R *2020*

- Taught data manipulation (dplyr) and visualization (ggplot2).
- Students ranked the course very good or excellent in a survey.

Max Planck Institute of Molecular Cell Biology and Genetics *Dresden, Germany*

Alternative splicing *2011*

- Pre-doc practical course.
- Taught chromatin imunnoprecipitation and 3'RACE.
- Supervised the students as they carried out the experiments.

Max Planck Institute of Molecular Cell Biology and Genetics *Dresden, Germany*

Chromatin IP and RNA localization *2011*

- Pre-doc practical course.
- Taught primer design and qPCR.
- supervised the students whilst they carried out the experiments.

University of Leicester *Leicester, United Kingdom*

Laboratory supervision and mentoring of a medical BSc student *2006 - 2007*

- Taught molecular biology techniques.
- Designed experiments and supervised daily work.
- For his project the student received a BSc Honours Degree.

University of Leicester *Leicester, United Kingdom*

Key skills in scientific writing and presentation (MB1002) *2006 - 2007*

- Pre-doc practical course.
- Advising 1st year BSc students on scientific communication.
- Marking essays/presentations.

University of Coimbra *Coimbra, Portugal*

Basic research skills to medical students *2003*

- Semester long research project.
- Introduced Medical students to cell biology techniques.
- Supervised benchwork.

Grants, Honors & Awards

International

2011 - 2013 **Marie Curie Intra-European fellowship for career development**, FP7, U.E. *Desdren, Germany*

2002 **Training program in molecular neuroscience scholarship**, Prodep III, U.E. *Coimbra Portugal*

Advanced courses & workshops

2018	**CSAMA 2018: Statistical Data Analysis for Genome Scale Biology**, practical course	*Brixen, Italy.*
2016	**Project management workshop**, Two day workshop	*Mainz, Germany.*
2013	**Programming for Evolutionary Biology**, Two weeks, intensive Practical course	*Leipzig, Germany.*
2013	**"Software Carpentry"** , practical course	*Freising, Germany.*
2012	**Introduction to Biopython**, practical course	*Leuven, Belgium.*
2012	**Advanced RNA-Seq and ChiP-Seq Data Analysis**, practical course	*Hinxton, United Kingdom.*
2012	**Principles of Light Microscopy**, practical course	*Desdren Germany.*
2012	**Pieces & parts: a primer on brain dissection from discrete regions to micronuclei**, practical course	*Aveiro, Portugal.*

Publications & presentations

Asterisk (*) denotes equal contribution of the first two authors.

Peer-reviewed Papers

The RNA binding protein human antigen R is a gatekeeper of liver homeostasis
Subramanian, P., S. Gargani, A. Palladini, M. Chatzimike, M. Grzybek, M. Peitzsch, A. D. Papanastasiou, I. Pyrina, V. Ntafis, B. Gercken, M. Lesche, A. Petzold, A. Sinha, M. Nati, V. R. Thangapandi, I. Kourtzelis, M. Andreadou, A. Witt, A. Dahl, R. Burkhardt, R. Haase, **A. M. d. J. Domingues**, I. Henry, N. Zamboni, P. Mirtschink, K.-J. Chung, J. Hampe, Ü. Coskun, D. L. Kontoyiannis, and T. Chavakis
Hepatology ()

Exosomal miRNAs from Prostate Cancer Impair Osteoblast Function in Mice
Furesi, G., **A. M.** de **Jesus Domingues**, D. Alexopoulou, A. Dahl, M. Hackl, J. R. Schmidt, S. Kalkhof, T. Kurth, H. Taipaleenmäki, S. Conrad, C. Hofbauer, M. Rauner, and L. C. Hofbauer
International Journal of Molecular Sciences 23.3 p. 1285. 2022

Membrane-associated cytoplasmic granules carrying the Argonaute protein WAGO-3 enable paternal epigenetic inheritance in Caenorhabditis elegans
Schreier, J., S. Dietz, M. Boermel, V. Oorschot, A.-S. Seistrup, **A. M.** de **Jesus Domingues**, A. W. Bronkhorst, D. A. H. Nguyen, S. Phillis, E. J. Gleason, S. W. L'Hernault, C. M. Phillips, F. Butter, and R. F. Ketting
Nature Cell Biology pp. 1–13. 2022

Intrinsically disordered protein PID-2 modulates Z granules and is required for heritable piRNA-induced silencing in the Caenorhabditis elegans embryo
Placentino, M., **A. M.** de **Jesus Domingues**, J. Schreier, S. Dietz, S. Hellmann, B. F. de Albuquerque, F. Butter, and R. F. Ketting
The EMBO Journal 40.3 e105280. 2021

* Extensive nuclear gyration and pervasive non-genic transcription during primordial germ cell development in zebrafish
Redl, S., **A. M.** de **Jesus Domingues**, E. Caspani, S. Möckel, W. Salvenmoser, M. Mendez-Lago, and R. F. Ketting
Development 148.2 dev193060. 2021

Bardet-Biedl syndrome proteins modulate the release of bioactive extracellular vesicles
Volz, A.-K., A. Frei, V. Kretschmer, **A. M.** de **Jesus Domingues**, R. F. Ketting, M. Ueffing, K. Boldt, E.-M. Krämer-Albers, and H. L. May-Simera
Nature Communications 12.1 p. 5671. 2021

Condensation of Ded1p Promotes a Translational Switch from Housekeeping to Stress Protein Production
Iserman, C., C. D. Altamirano, C. Jegers, U. Friedrich, T. Zarin, A. W. Fritsch, M. Mittasch, **A. Domingues**, L. Hersemann, M. Jahnel, D. Richter, U.-P. Guenther, M. W. Hentze, A. M. Moses, A. A. Hyman, G. Kramer, M. Kreysing, T. M. Franzmann, and S. Alberti
Cell 181.4 pp. 818–831. 2020

Innate Immune Training of Granulopoiesis Promotes Anti-tumor Activity
Kalafati, L., I. Kourtzelis, J. Schulte-Schrepping, X. Li, A. Hatzioannou, T. Grinenko, E. Hagag, A. Sinha, C. Has, S. Dietz, **A. M.** de **Jesus Domingues**, M. Nati, S. Sormendi, A. Neuwirth, A. Chatzigeorgiou, A. Ziogas, M. Lesche, A. Dahl, I. Henry, P. Subramanian, B. Wielockx, P. Murray, P. Mirtschink, K.-J. Chung, J. L. Schultze, M. G. Netea, G. Hajishengallis, P. Verginis, I. Mitroulis, and T. Chavakis
Cell 183.3 771–785.e12. 2020

* Maternal and zygotic gene regulatory effects of endogenous RNAi pathways
Almeida, M. V., **A. M. d. J. Domingues**, and R. F. Ketting
PLOS Genetics 15.2 e1007784. 2019

* RppH can faithfully replace TAP to allow cloning of 5'-triphosphate carrying small RNAs
Almeida, M. V., **A. M.** de **Jesus Domingues**, H. Lukas, M. Mendez-Lago, and R. F. Ketting
MethodsX. 2019

PETISCO is a novel protein complex required for 21U RNA biogenesis and embryonic viability
Rodrigues, R. J. C., **A. M. d. J. Domingues**, S. Hellmann, S. Dietz, B. F. M. d. Albuquerque, C. Renz, H. D. Ulrich, P. Sarkies, F. Butter, and R. F. Ketting
Genes & Development 33.13-14 pp. 857–870. 2019

Tdrd6a Regulates the Aggregation of Buc into Functional Subcellular Compartments that Drive Germ Cell Specification
Roovers, E. F., L. J. T. Kaaij, S. Redl, A. W. Bronkhorst, K. Wiebrands, **A. M.** de **Jesus Domingues**, H.-Y. Huang, C.-T. Han, S. Riemer, R. Dosch, W. Salvenmoser, D. Grün, F. Butter, A. van Oudenaarden, and R. F. Ketting
Developmental Cell 46.3 285–301.e9. 2018

Characterization of genetic loss-of-function of Fus in zebrafish
Lebedeva, S., **A. M.** de **Jesus Domingues**, F. Butter, and R. F. Ketting
RNA Biology 14.1 pp. 29–35. 2017

Enhancers reside in a unique epigenetic environment during early zebrafish development
Kaaij, L. J. T., M. Mokry, M. Zhou, M. Musheev, G. Geeven, A. S. J. Melquiond, **A. M.** de **Jesus Domingues**, W. de Laat, C. Niehrs, A. D. Smith, and R. F. Ketting
Genome Biology 17 p. 146. 2016

Abundant cytomegalovirus (CMV) reactive clonotypes in the CD8+ T cell receptor alpha repertoire following allogeneic transplantation
Link, C. S., A. Eugster, F. Heidenreich, E. Rücker-Braun, M. Schmiedgen, U. Oelschlägel, D. Kühn, S. Dietz, Y. Fuchs, A. Dahl, **A. M.** de **Jesus Domingues**, C. Klesse, M. Schmitz, G. Ehninger, M. Bornhäuser, J. Schetelig, and E. Bonifacio
Clinical & Experimental Immunology 184.3 pp. 389–402. 2016

SR proteins are NXF1 adaptors that link alternative RNA processing to mRNA export

Müller-McNicoll, M., V. Botti, **A. M.** de **Jesus Domingues**, H. Brandl, O. D. Schwich, M. C. Steiner, T. Curk, I. Poser, K. Zarnack, and K. M. Neugebauer
Genes & Development 30.5 pp. 553–566. 2016

Tox: a multifunctional transcription factor and novel regulator of mammalian corticogenesis
Artegiani, B., **A. M.** de **Jesus Domingues**, S. B. Alonso, E. Brandl, S. Massalini, A. Dahl, and F. Calegari
The EMBO Journal 34.7 pp. 896–910. 2015

Identification of four functional NR3B isoforms in developing white matter reveals unexpected diversity among glutamate receptors.
Domingues, **A. M. d. J.**, K. M. Neugebauer, and R. Fern
Journal of neurochemistry 117.3 pp. 449–60. 2011

Toxicity of beta-amyloid in HEK293 cells expressing NR1/NR2A or NR1/NR2B N-methyl-D-aspartate receptor subunits.
Domingues, **A.**, S. Almeida, E. F. da Cruz e Silva, C. R. Oliveira, and A. C. Rego
Neurochemistry international 50.6 pp. 872–80. 2007

FK506 prevents mitochondrial-dependent apoptotic cell death induced by 3-nitropropionic acid in rat primary cortical cultures.
Almeida, S., **A. M.** de **Jesus Domingues**, L. Rodrigues, C. R. Oliveira, and A. C. Rego
Neurobiology of disease 17.3 pp. 435–44. 2004

Preprints & others

Extensive nuclear gyration and pervasive non-genic transcription during primordial germ cell development in zebrafish
Redl, S., **A. M.** de **Jesus Domingues**, S. Möckel, W. Salvenmoser, M. Mendez-Lago, and R. F. Ketting
bioRxiv p. 2020.01.10.901306. 2020

Identification of Tox chromatin binding properties and downstream targets by DamID-Seq
Jesus Domingues, **A. M.** de, B. Artegiani, A. Dahl, and F. Calegari
Genomics Data 7 pp. 264–268. 2016

Reviews

* White matter synapses: form, function, and dysfunction.
Alix, J. J. P. and **A. M.** de **Jesus Domingues**
Neurology 76.4 pp. 397–404. 2011

Glia as transmitter sources and sensors in health and disease.
Domingues, **A. M. d. J.**, M. Taylor, and R. Fern
Neurochemistry international 57.4 pp. 359–66. 2010

Conference Proceedings

Expression of NR1/NR2B N-methyl-D-aspartate receptors enhances heroin toxicity in HEK293 cells.
Domingues, **A.**, T. Cunha Oliveira, M. L. N. Laço, T. R. A. Macedo, C. R. Oliveira, and A. C. Rego
Annals of the New York Academy of Sciences 1074 pp. 458–65. 2006

Oral Presentations

A family portrait: global effects of SR protein depletion on alternative splicing
Jesus Domingues, **A. M.** de, M. Müller-McNicoll, M.-L. Ankö, and K. M. Neugebauer
8th Special Interest Group meeting on Alternative Splicing, 2011, Viena, Austria

NMDA Receptor Subunit composition Influences AßToxicity
Domingues, **A.**, E. F. da Cruz e Silva, C. R. Oliveira, and A. C. Rego
34th Meeting of the Portuguese Pharmacology Society, 2003, Coimbra, Portugal

Selected Poster Presentations

* Activation of the genome in germ cells in relation to transposon silencing and the piRNA pathway
Jesus Domingues, **A. M.** de, S. Redl, E. Caspani, H. Dill, and R. F. Ketting
Mobile Genetic Elements and Genome Plasticity, 2018, Santa Fé, NM, USA

Regulation of gene expression by SR proteins: a comprehensive study
Jesus Domingues, **A. M.** de, M. Müller-McNicoll, and K. M. Neugebauer
Special Interest Group meeting on Integrative RNA Biology (AS-SIG), 2013, Berlin, Germany

Characterization of novel NMDA receptor subtypes
Jesus Domingues, **A. M.** de, M. G. Salter, and R. Fern
Society for Neuroscience, 2008, Washington, USA

References

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