

Márcio Duarte Albasini Mourão

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Education

Informatics and Computing

PhD (Advisor: Dr. Santiago Schnell, International Scholarship Awarded), Indiana

Specialization: Computational Biology & Complex Systems, Minor: Molecular Biology

Indiana University

2006–2011

Computational Biology

Pre-PhD Program, Lisbon

Note: Year long interdisciplinary program with classes in computational biology

Instituto Gulbenkian e Ciência

2005–2006

Informatics Engineering and Computers

Masters (Advisor: Dr. Nuno Mamede), Lisbon

Specialization: Artificial Intelligence

Universidade Técnica de Lisboa

2002–2005

Informatics Engineering and Computers

Licentiate, Lisbon

Specialization: Artificial Intelligence

Universidade Técnica de Lisboa

1997–2002

Experience

Consulting for Statistics, Computing & Analytics Research (CSCAR)

Data Science Consultant

University of Michigan

2016–2019

- Advised several dozen clients on statistics, machine learning and data science related topics, resulting in 4 publications to date. Topics ranged from interpretation of p-values to identifying vessels in kidneys using deep learning/convolutional neural networks.
- Performed data cleaning, built statistical summaries, applied statistical methodology on research projects. Projects with clients included the investigation of the effects of stress and disease knowledge on Chronic Kidney Disease (CKD) and analysis of Raman spectral data to identify and quantify cellular components.
- Developed and taught 33 data science related workshops, with demonstrations developed in Python and MatLab. Topics included 'Best practices in scientific computing', 'Classification, regression and model selection', 'Supervised and unsupervised machine learning', 'Random forests' and 'Support vector machines'.
- Taught Stats 607 - Programming and Numerical Methods in Statistics (Python based) for the Statistics Department at the University of Michigan.

Mathematical Biosciences Institute

Postdoctoral Researcher

The Ohio State University

2013–2016

- Investigated the contribution of individual microtubule dynamical parameters and microtubule interactions to the self-organization of microtubule arrays in plant-based systems.
- Investigated the role of macromolecular crowding in diffusion and reaction kinetics.
- Investigated the effect of pheromones in the lifespan and mortality rates of *Drosophila* flies.
- Investigated P-Body mechanisms in the interaction network of the RNA silencing pathway.
- Mentored a PhD student in the development of a new approach to calculate excluded volume in cells.

Department of Molecular & Integrative Physiology

Postdoctoral Researcher

University of Michigan

2011–2013

- Developed a Monte-Carlo approach to investigate the role of crowding in reaction kinetics (Cover article).

- Developed a computational and a statistical method to analyze oscillatory data.
- Investigated the contribution of individual microtubule dynamical parameters to steady-state microtubule arrays in animal cells.
- Organized weekly lab meetings and mentored one undergraduate student.

Publications

In Preparation

- Shahbaz Ahmed, June Tome, **Marcio Mourao**, Emily Chen, Sam Harrison, Angela Fagerlin, Julie Wright Nunes. Associations Between Web-based Resource Use and Patient Centered Outcomes in Chronic Kidney Disease (CKD) (Research Article).
- **M. A. Mourão**, S. Shaw. The role of nucleation, extinction and severing in the cellular microtubule plant cortex (Research Article).
- I. Muhammad, **M. A. Mourão**, M. Roussel. A new Monte-Carlo approach for the calculation of available volumes I (Research Article).
- I. Muhammad, **M. A. Mourão**, M. Roussel. A new Monte-Carlo approach for the calculation of available volumes II (Research Article).
- Jeff DeWitt, Angela Fagerlin, **M. A. Mourão**, Emily Chen, Samantha Harison, Gunjan Garg, Julie Wright Nunes. The CKD Stress Scale: Development and Identification of Patients at Risk (Research Article) (Submitted).

Published

- Mitwalli, H., **Mourao, M.D.A.**, Dennison, J., Yaman, P., Paster, B.J., Fontana, M. (2019). Effect of Silver Diamine Fluoride Treatment on Microbial Profiles of Plaque Biofilms from Root/Cervical Caries Lesions. *Caries Research*, (Accepted)
- Pitchiaya, S., **Mourao, M.D.A.**, Jalihal, J., Xiao, L., Jiang, X., Chinnaiyan, A.M., Schnell, S. and Walter, N.G. (2019). Dynamic recruitment of single RNAs to processing bodies depends on RNA functionality. *Mol. Cell* 74, 521-533, DOI: 10.1016/j.molcel.2019.03.001.
- LaLone, Vernon and Fawaz, Maria V. and Morales-Mercado, Jomar and **Mourão, Márcio A.** and Snyder, Catherine S. and Kim, Sang Yeop and Lieberman, Andrew P. and Tuteja, Anish and Mehta, Geeta and Standiford, Theodore J. and Raghavendran, Krishnan and Shedden, Kerby and Schwendeman, Anna and Stringer, Kathleen A. and Rosania, Gus R. (2019). Inkjet-printed micro-calibration standards for ultraquantitative Raman spectral cytometry. *Analyst*, DOI: 10.1039/C9AN00500E.
- LaLone, Vernon and **Mourão, Márcio A.** and Standiford, Theodore J. and Raghavendran, Krishnan and Shedden, Kerby and Stringer, Kathleen A. and Rosania, Gus R. (2018). An Expandable Mechanopharmaceutical Device (3): a Versatile Raman Spectral Cytometry Approach to Study the Drug Cargo Capacity of Individual Macrophages. *Pharmaceutical Research*, 36, 1, DOI: 10.1007/s11095-018-2540-0.
- Z. Harvanek, **M. A. Mourão**, S. Schnell, S. Pletcher (2016). A Computational Approach to Studying Ageing at the Individual Level. *Proceedings of the Royal Society B* 283, 1824, DOI: 10.1098/rspb.2015.2346.
- **M. A. Mourão**, J. Hakim, S. Schnell (2014). Connecting the dots: the effects of macromolecular crowding on cell physiology (Review). *Biophysical Journal* 107, 12, 2761-2766, DOI: 10.1016/j.bpj.2014.10.051.
- **M. A. Mourão**, L. Satin, S. Schnell (2014). Optimal experimental design to estimate statistically significant oscillatory periods in time course data. *PLOS ONE* 9, e93826. DOI:10.1371/journal.pone.0093826.
- **M. A. Mourão**, D. Kreitman and S. Schnell (2014). Unravelling the impact of obstacles in diffusion and kinetics of an enzyme catalysed reaction. *Physical Chemistry Chemical Physics* 16, 4492-4503. DOI: 10.1039/C3CP52417E.
- L. Zheng, Y. J. Seon, **M. A. Mourão**, S. Schnell, D. Kim, H. Harada, S. Papagerakis and P. Papagerakis (2013). Circadian rhythms regulate amelogenesis. *Bone*. DOI:10.1016/j.bone.2013.02.011.
- **M. A. Mourão**, S. Schnell, S. L. Shaw (2011). Macroscopic simulations of microtubule dynamics predict two steady-state processes governing array morphology. *Computational Biology & Chemistry* 35, 269-281. DOI: 10.1016/j.compbiolchem.2011.06.002.
- **M. A. Mourão**, J. Srividhya, P. E. McSharry, E. J. Crampin and S. Schnell (2011). MIKANA: Method for Inferring Kinetics and Network Architecture. *PLoS ONE* 6, e27534. DOI: 10.1371/journal.pone.0027534.

- J. Srividhya, **M. A. Mourão**, E. J. Crampin, S. Schnell (2010). Enzyme kinetics: from experiments to computational mechanism reconstruction. *Computational Biology & Chemistry* 34, 11-18. DOI: 10.1016/j.compbiolchem.2009.10.007.
- João Neto, Renato Cassaca, Márcio Viveiros, **M. A. Mourão** (2006). Design of a Multimodal Input Interface for a Dialogue System. *Lecture Notes in Computer Science* 3960/2006, 170-179. DOI: 10.1007/11751984_18.
- J. Graça, **M. A. Mourão**, O. Anunciação, P. Monteiro, H. S. Pinto, V. Loureiro (2005). Ontology Building Process: The Wine Domain. EFITA / WCCA, Proceedings of the 5th Conference of the European Federation for Information Technology in Agriculture, Food and Environment.
- **M. A. Mourão**, Renato Márcio de França Cassaca, Nuno J. Mamede (2004). An Independent Domain Dialog System Through a Service Manager. *Lecture Notes in Computer Science* 3230 161-171. DOI: 10.1007/978-3-540-30228-5_15.
- **M. A. Mourão**, Pedro Daniel Santiago Madeira, Nuno J. Mamede (2003). Interpretations and Discourse Obligations in a Dialog System. *Lecture Notes in Computer Science* 2721,197-200. DOI: 10.1007/3-540-45011-4_31.
- Pedro Daniel Santiago Madeira, **M. A. Mourão**, Nuno J. Mamede (2003). STAR - A Multiple Domain Dialog Manager. Proceedings of the 5th International Conference on Enterprise Information Systems, 490-494.

Thesis

- **M. A. Mourão**, Reverse engineering the mechanisms and the dynamical behavior of complex biochemical pathways (2011). PhD, Advisor: Dr. Santiago Schnell, Indiana University.
- **M. A. Mourão**, Management and Representation of Domains in Dialogue Systems (2005). Masters, Advisor: Dr. Nuno Mamede, Universidade Técnica de Lisboa.

Presentations

- **M. A. Mourão**, Using Machine Learning to analyze transportation data (June 2017). Midwest Big Data Hub Transportation Symposium, Ann Arbor, Michigan. Oral Presentation/Tutorial.
- **M. A. Mourão**, A computational approach to study aging at the individual level (April 2016). MBI Postdoctoral Seminar, Mathematical Biosciences Institute (MBI), Columbus, Ohio. Oral Presentation.
- **M. A. Mourão**, Using Monte-Carlo simulations to understand collective behavior in complex biological systems (March 2015). MBI Postdoctoral Seminar, Mathematical Biosciences Institute (MBI), Columbus, Ohio. Oral Presentation.
- **M. A. Mourão**, Designing simulations to understand reactions inside cells (October 2014). Modern Math Workshop, Los Angeles, California. Oral Presentation.
- **M. A. Mourão**, Unraveling the role of obstacles in diffusion and reaction kinetics of an enzyme catalyzed reaction (August 2014). SIAM: Life Sciences Conference, Charlotte, N. Carolina. Oral Presentation.
- **M. A. Mourão**, D. Kreitman and S. Schnell. Unravelling the impact of obstacles in diffusion and kinetics of an enzyme catalyzed reaction (February 2014). 54th Annual Biophysics Meeting, San Francisco. Poster Presentation.
- **M. A. Mourão**, D. Kreitman, S. Schnell. Designing simulations to investigate reactions inside the cell (February 2014). MBI Postdoctoral Seminar, Mathematical Biosciences Institute (MBI), Columbus, Ohio. Oral Presentation.
- **M. A. Mourão**, D. Kreitman, S. Schnell. Unraveling the role of obstacles in diffusion and reaction kinetics of an enzyme catalyzed reaction (August 2013). Workshop for Young Researchers in Mathematical Biology (WYRMB), Mathematical Biosciences Institute (MBI), Columbus, Ohio. Poster Presentation.
- **M. A. Mourão**, S. Schnell. MIKANA: Method for the Inference of Kinetics and Network Architecture (September 2010). NCIBI Tools and Technology. Michigan State University, Department of Mathematics, Mathematical Biology Seminars. Oral Presentation.
- **M. A. Mourão**, S. Schnell. MIKANA: Method for the Inference of Kinetics and Network Architecture (May 2010). NCIBI Tools and Technology. Center for Computational Medicine and Bioinformatics (CCMB), University of Michigan. Oral Presentation.
- **M. A. Mourão**, S. Shaw, S. Schnell. Stochastic simulations of interphase microtubule arrays (February 2010). Biophysical Society 54th Annual Meeting. San Francisco, CA. Poster Presentation.
- **M. A. Mourão**, S. Shaw, S. Schnell. Stochastic simulations of cortical microtubule arrays in plant systems.

Society for Mathematical Biology (July 2008). Toronto, Ontario. Poster Presentation.

- **M. A. Mourão**, J. Srividhya, E. J. Crampin, P. E. McSharry, S. Schnell. Optimal experimental design of a reaction inference methodology (July 2007). Society for Mathematical Biology. San Jose, CA. Oral Presentation.
- **M. A. Mourão**, N. Mamede. An Independent Domain Dialogue System Through a Service Manager (2004), EsTAL - España for Natural Language Processing - Alicante, Spain. Oral Presentation.
- **M. A. Mourão**, N. Mamede. Interpretations and Discourse Obligations in a Dialogue System (2003), PROPOR, 6th Workshop on Computational Processing of the Portuguese Language - Written and Spoken, Faro, Portugal. Oral Presentation.

Teaching Experience

University of Michigan

Lecturer, Stats 607 - Programming and Numerical Methods in Statistics

Michigan

Fall 2018

Michigan State University

Visiting Instructor, Calculus I

Michigan

Spring 2011

Michigan State University

Visiting Instructor, Mathematical Biology

Michigan

Fall 2010

Universidade Técnica de Lisboa

Teaching Assistant, Introduction to Programming

Lisbon

Spring 2005

Universidade Técnica de Lisboa

Teaching Assistant, Distributed Systems

Lisbon

Fall 2004

Universidade Técnica de Lisboa

Teaching Assistant, Architecture and Organization of Enterprise Information Systems

Lisbon

Fall 2003

Universidade Técnica de Lisboa

Volunteer Instructor, MATLAB (MATrix LABoratory)

Lisbon

2002-2004

Mentoring Experience

- Iqbal Muhammad (PhD student in the Department of Chemistry & Biochemistry, University of Lethbridge, Alberta) - Current mentee.
- Doree Kreitmann (Undergrad student in the Department of Mathematics, University of Michigan, Michigan).

Skills

Languages: Python, MatLab, R, C++, C, Java, Mathematica, SQL.

Presentation Skills: Communicated research via oral and poster presentations at 15 scientific meetings.

Writing Skills: Published 17 peer-reviewed articles in scientific journals.

Software

- MIKANA - Method for Inferring Kinetics And Network Architecture - A freely downloadable software with a user friendly GUI for extracting reaction mechanisms from experimental time series data.
URL:<http://www.med.umich.edu/schnell-lab/mikana>.

Previous Research Support

- Identification of bistable network topologies associated with toxic aggregation thresholds found in conformational diseases (09/2010-08/2014), James S. McDonnell Foundation, Proposal 9184, Principal Investigator: Santiago Schnell, Role: Postdoctoral Research Fellow, Total funds (4 years): \$413,488.

Online Courses

Become a Journalist: Report the News, Michigan State University, Coursera, 2018.....

- What is News?
- Gathering and Developing the News.
- Effectively delivering the news to your audience.
- Journalism, the future, and you!

Volunteer Experience

Scientific Journal Reviews.....

- PloS ONE.
- Biophysics.
- Physical Biology.
- Physical Chemistry.
- Mathematical Biosciences.
- Mathematics and Computers in Simulations.

Non-Academic Publications.....

Raia Diplomática

- Márcio Mourão, Daniel Sobral. Ciência holística (Holistic science).
- Márcio Mourão, Daniel Sobral. Medicina personalizada (Personalized medicine).
- Márcio Mourão, Daniel Sobral. Nanomedicina (Nanomedicine).
- Márcio Mourão, Daniel Sobral. Células estaminais (Stem cells).
- Márcio Mourão, Daniel Sobral. A rejeição de transplantes: problema resolvido? (Transplant rejection: problem solved?).
- Márcio Mourão, Daniel Sobral. Alternativa para uma cura ao cancro? (An alternative to cancer?).

Kompleta (Semanário Notícias da Madeira, Portugal)

- Márcio Mourão. Reprodução sexual (Sexual reproduction).
- Márcio Mourão. Células estaminais (Stem cells).
- Márcio Mourão. Porque seguram as mulheres os bebés no braço esquerdo (Why do women hold their babies in the left arm?).
- Márcio Mourão. Sangue (Blood).
- Márcio Mourão. Fotossíntese (Photosynthesis).
- Márcio Mourão. Uma explicação evolucionária para as emoções (An evolutionary explanation for emotions).
- Márcio Mourão. O tabaco (Tobacco).
- Márcio Mourão. O sistema imunitário (The immune system).
- Márcio Mourão. O cancro (Cancer).
- Márcio Mourão. A gripe (The common cold).
- Márcio Mourão. Biologia do desenvolvimento (Developmental biology).
- Márcio Mourão. A SIDA (AIDS).
- Márcio Mourão. Evolução ou criação (Evolution or Creation).
- Márcio Mourão. O ébola (Ebola).
- Márcio Mourão. Porque envelhecemos e morremos (Why do we grow old and die).
- Márcio Mourão. A vida e a morte (Life and death).
- Márcio Mourão. A estrutura hierárquica da vida (The hierarchical structure of life).
- Márcio Mourão. A hibernação (Hibernation).
- Márcio Mourão. O transplante de órgãos (Organ transplant).
- Márcio Mourão. Os diabetes (Diabetes).

- Márcio Mourão. A clonagem (Cloning).
- Márcio Mourão. SNP (Single Nucleotide Polymorphisms).
- Márcio Mourão. Medicina personalizada (Personalized medicine).
- Márcio Mourão. A mudança climática (Climate change).
- Márcio Mourão. Árvores filogenéticas (Phylogenetic trees).

Informatics Intern.....

Câmara Municipal de Vila Franca de Xira
Social Services, Lisbon

1997