Maria RODRIGUEZ-FERNANDEZ

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ACADEMIC APPOINTMENTS

Aug 2023-present	**Visiting Professor** at the Institute for Collaborative Biotechnologies (ICB), University of California Santa Barbara (UCSB).
Dec 2021-present	**Associate Professor** at the Institute for Biological and Medical Engineering (IIBM), Pontificia Universidad Católica de Chile (UC).
Jan 2019-Aug 2023	**Director of Graduate Studies, Head of the MSc and PhD in Biological and Medical Engineering Programs,** IIBM, UC**.**
2021	**Director of the "Engineering 2" FONDECYT study group.**
2016-2021	**Assistant Professor** at the IIBM, UC.
April 2012-April 2014	**Assistant Project Scientist** at the Department of Chemical Engineering, Institute for Collaborative Biotechnologies, University of California Santa Barbara (UCSB).
April 2010-April 2012	**Postdoctoral Scholar** at the Department of Chemical Engineering, Institute for Collaborative Biotechnologies, UCSB. Advisor: Prof. Francis J. Doyle III
June 2007-Feb 2010	**Postdoctoral Researcher** at the Bio-Process Engineering Group, **IIM-CSIC**, Vigo, Spain. Advisor: Prof. Julio R. Banga
Aug 2006-May 2007	**Research Associate** at the Centre for Process Systems Engineering, Department of Chemical Engineering and Chemical Technology, **Imperial College London, UK**. Project supervisors: Prof. Nilay Shah, Prof. Costas Pantelides and Dr. Sergei Kucherenko

PROFESSIONAL APPOINTMENTS

Sept 2014-Sept 2015	**Principal Scientist** at the Pharmacokinetics, Dynamics and Metabolism (PDM) department in **Pfizer Inc.** Member of the *Translational Modeling and Simulation* group.
Feb-Jul 2000	**Intern** at the **Institut Français du Pétrole (IFP)** (Lyon, France).

EDUCATION

2016-2017	**Diplomado en Docencia Universitaria,** Pontificia Universidad Católica de Chile.
2002-2006	**PhD Chemical Engineering** at the **Bio-Process Engineering Group, IIM-CSIC**, Vigo, Spain. **Extraordinary doctorate award.** Thesis Title: ***Modeling and identification of bioprocesses*****.**
1996-2001	**Chemical Engineering.** University of Santiago de Compostela, Spain.
1999-2000	Last year of the ***École National Supérieure des Mines de Saint-Etienne***, France.

RESEARCH GRANTS

1. **Assessing the influence of the time of feeding on blood pressure and glucose dynamics through a multi-scale modeling approach,** FONDECYT Regular #1230844, 2023-2027, Principal Researcher.

2. **Cyber-physical systems for personalized healthcare: a data-driven approach for improved management of diabetes and hypertension,** Anillo de Investigación en Ciencia y Tecnología, ACT210083, 2021-2024, Director.
3. **Millennium Institute for Intelligent Healthcare Engineering,** Instituto Milenio en Ciencias Naturales y Exactas, ICN2021_004, 2021-2031, Principal Researcher.
4. **SUEÑA,** *Somos Innovación: Concurso de Innovación en Salud*, Comité de Innovación, Desarrollo y Estrategia (CIDE) UC Christus, 2021, Co-investigator.
5. **Lipophilic statins inhibit the exosome-mediated and obesity-induced cancer progression: the relevance of reestablishing natural killer cell immune surveillance to delay recurrence and improve future therapeutic outcomes in high-grade serous ovarian cancer,** FONDECYT Regular # 1201083, 2020-2024, Researcher.
6. **A Multi-Variable IoT-Ready Artificial Pancreas for Type 1 Diabetes Control,** Concurso Investigación Interdisciplinaria VRI-UC, II190005, 2020-2022, Researcher.
7. **Vigilancia activa en cáncer de próstata: efectividad de la firma de cuatro ARNs largos no codificantes como marcador tisular de pronóstico tumoral,** FONIS #SA19I0042, 2020-2022, Researcher.
8. **Understanding the Circadian Rhythms of Blood Pressure in Humans through Mathematical Modeling and Computational Tools**, FONDECYT Regular #1181094, 2018-2022, Principal Researcher.
9. **Neural Mechanisms of Brain Self-regulation with Brain-Machine Interfaces and Application to Addiction**, 2018-2021, Anillo de Investigación en Ciencia y Tecnología, CONICYT-PIA #172121, Associate Researcher.

WOS JOURNAL PUBLICATIONS (2350 citations, h-index=20, i10-index=29)

1. Paéz V, Rodriguez-Fernandez M, Morales D, Torres C, Ardiles A, Soza S, Bustos C, Manríquez F, García C, Rocco R and Lang M (2023) **Quality of life, exercise capacity, cognition, and mental health of Chilean patients after COVID-19: an experience of a multidisciplinary rehabilitation program at a physical and rehabilitation medicine unit.** *Front. Rehabil. Sci. 4:1274180*. DOI: 10.3389/fresc.2023.1274180
2. Langarica S., Rodriguez-Fernandez M., Doyle III, F.J., Núñez F. (2023) **A Probabilistic Approach to Blood Glucose Prediction in Type 1 Diabetes under Meal Uncertainties.** *IEEE Journal of Biomedical and Health Informatics.* DOI: 10.1109/JBHI.2023.3309302.
3. Rodriguez-Fernandez M. (2023) **Editorial: Circadian rhythm in metabolism and endocrinology**. Front. Endocrinol. 14:1263823. DOI: 10.3389/fendo.2023.1263823
4. Vargas G., Araya D., Sepulveda P., Rodriguez-Fernandez M., Friston K., Sitaram R., El-Deredy W. (2023) **Self-regulation learning as Active inference: Dynamic causal modeling of an fMRI neurofeedback task.** *Frontiers in Neuroscience, 17:1212549.* DOI: 10.3389/fnins.2023.1212549.
5. Langarica S., Rodriguez-Fernandez M., Núñez F., Doyle III, F.J. (2023) **A Meta-Learning Approach to Personalized Blood Glucose Prediction in Type 1 Diabetes.** *Control Engineering Practice, 135: 105498*. DOI: 10.1016/j.conengprac.2023.105498.
6. Miranda Hurtado M., Steinback C.D, Davenport M.H., Rodriguez-Fernandez M. (2023) **Increased respiratory modulation of cardiovascular control reflects improved blood pressure regulation in pregnancy**. *Frontiers in Physiology, 14:1070368*. DOI: 10.3389/fphys.2023.1070368
7. Cortés-Ríos J, Rodriguez-Fernandez M. (2023) **Understanding the dosing-time-dependent antihypertensive effect of valsartan and aspirin through mathematical modeling**, *Frontiers in Endocrinology, 14:1110459*. DOI: 10.3389/fendo.2023.1110459
8. Páez V, Rodriguez-Fernandez M, Silva-Urra J, Núñez-Espinosa C, Lang M. (2023) **Maximal pulmonary ventilation and lactate affect the anaerobic performance in young women exposed to hypobaric hypoxia.** *Frontiers in Physiology, 14:1110477*. DOI 10.3389/fphys.2023.1110477

9. Cortés-Ríos J, Hermida RC, Rodriguez-Fernandez M. (2022) **Dosing time optimization of antihypertensive medications by including the circadian rhythm in pharmacokinetic-pharmacodynamic models.** *PLoS Computational Biology, 18(11): e1010711*. DOI:10.1371/journal.pcbi.1010711
10. Thakkar I, Arraño-Carrasco L, Cortés-Rivera B, Zunino-Pesce R, Mery-Muñoz F, Rodriguez-Fernandez M, Smits M, Mendez-Orellana C. (2022) **Alternative Language Paradigms for Functional Magnetic Resonance Imaging as Presurgical Tools for Inducing Crossed Cerebro-Cerebellar Language Activations in Brain Tumor Patients**. *European Radiology, 32:300-307.*DOI:10.1007/s00330-021-08137-9
11. Valdivia-Olivares RY, Rodriguez-Fernandez M, Álvarez-Figueroa MJ, Kalergis AM, Gonzalez-Aramundiz JV. (2021) **The Importance of Nanocarrier Design and Composition for an Efficient Nanoparticle-Mediated Transdermal Vaccination.** *Vaccines, 9, 1420.* DOI: 10.3390/vaccines9121420
12. Cordova-Delgado M, Bravo ML, Cumsille E, Hill CN, Pinto MP, Muñoz-Medel M, Retamal IN, Lavanderos MA, Miquel JF, Rodriguez-Fernandez M, Liao Y, Li Z, Garrido M, Quiñones LA, Owen GI. (2021) **A case-control study of a combination of single nucleotide polymorphisms and clinical parameters to predict clinically relevant toxicity associated with fluoropyrimidine and platinum-based chemotherapy in gastric cancer.** *BMC Cancer, 21 (1), 1-18.* DOI: 10.1186/s12885-021-08745-0
13. Sepúlveda A, Castillo F, Palma C, & Rodriguez-Fernandez M. (2021) **Emotion recognition from ECG signals using wavelet scattering and machine learning.** *Applied Sciences, 11(11), 4945.* DOI: 10.3390/app11114945
14. Thakkar I, Massardo T, Pereira J, Quintana JC, Risco L, Saez CG, Corral S, Villa C, Spuler J, Olivares N, Valenzuela G, Castro G, Riedel B, Vicentini D, Muñoz D, Lastra R & Rodriguez-Fernandez M. (2021) **Identification of Statin's Action in a Small Cohort of Patients with Major Depression.** *Applied Sciences, 11, 2827.* DOI: 10.3390/app11062827
15. Cortés-Ríos J & Rodriguez-Fernandez M. (2021) **Circadian rhythm of blood pressure of dipper and non-dipper patients with essential hypertension: a mathematical modeling approach.** *Frontiers in Physiology, 11:536146.* DOI: 10.3389/fphys.2020.536146
16. Miranda Hurtado M, Reyes Vasquez J & Rodriguez-Fernandez M. (2021) **Comparison of a tonometric with an oscillometric blood pressure monitoring device over 24 hours of ambulatory use**. *Blood Pressure Monitoring, 26(2):149-155*. DOI: 10.1097/MBP.0000000000000511
17. Suárez A, Núñez F & Rodriguez-Fernandez M. (2021) **Circadian Phase Prediction from Non-Intrusive and Ambulatory Physiological Data.** *IEEE Journal of Biomedical and Health Informatics, 25(5).* DOI: 10.1109/JBHI.2020.3019789
18. Cortés-Ríos J, Zárate AM, Figuero JD, Medina J, Fuentes-Lemus E, Rodriguez-Fernandez M, Aliaga M, López-Alarcón C. (2020) **Protein quantification by BCA assay follows complex kinetics and can be applied at short times.** *Analytical Biochemistry, 608, 113904.* DOI: 10.1016/j.ab.2020.113904
19. Valle C, Rodriguez-Fernandez M & Eblen-Zajjur A. (2020) **Spikes & Nets (S&N): a new fast, parallel computing, point process software for multineuronal discharge and connectivity analysis.** *Neural Processing Letters, 52: 385–402.* DOI: 10.1007/s11063-020-10242-7
20. Cortés-Ríos J, Valdivia-Olivares RV, Álvarez-Figueroa MJ, Rodriguez-Fernandez M, Gonzalez Aramundiz JV (2020) **Optimization of physicochemical properties of novel multiple nanoemulsion for complex food matrices through iterative mathematical modelling**. *Journal of Food Engineering*, 276: 109883. DOI:10.1016/j.jfoodeng.2019.109883
21. Martinez-Aguayo A., Campino C., Rodriguez-Fernandez M., et al. (2020) **Urinary sodium-to-potassium ratio and plasma renin and aldosterone concentrations in normotensive children: Implications for the interpretation of results.** *Journal of Hypertension, 38:671–678*. DOI: 10.1097/HJH.0000000000002324
22. Frésard M.E., Erices R., Bravo M.L., Cuello M., Owen G.I., Ibáñez C. & Rodriguez-Fernandez M. (2020) **Multi-objective optimization for personalized prediction of venous thromboembolism in ovarian cancer patients**. *IEEE Journal of Biomedical and Health Informatics, 24(5).* DOI: 10.1109/JBHI.2019.2943499
23. Miranda Hurtado M., Meza Valladares C., Eblen-Zajjur A. & Rodriguez-Fernandez M. (2019) **Acute cardiovascular responses to a session of Bikram yoga: a pilot uncontrolled trial.** *Journal of Alternative and Complementary Medicine, 25(4): 398-405,* DOI: 10.1089/acm.2018.0261

24. Owen G. I., Pinto M.P., Retamal I.N., Fernández M.F., Cisternas B., Mondaca S., Sanchez C., Galindo H., Nervi B., Ibañez C., Acevedo F., Madrid J., Peña J., Bravo M.L., Maturana M.J., Cordova-Delgado M., Romero D., de la Jara N., Torres J., Rodriguez-Fernandez M., Espinoza M., Balmaceda C., Freire M., Gárate-Calderón V., Crovari F., Jimenez-Fonseca P., Carmona-Bayonas A., Zwenger A., Armisen R., Corvalan A.H., Garrido M. (2018) **Chilean Gastric Cancer Task Force: A study protocol to obtain a clinical and molecular classification of a cohort of gastric cancer patients.** *Medicine, 97(16): e0419*. DOI: 10.1097/MD.0000000000010419

25. Buñay J, Larriba E., Patiño-Garcia D., Cruz-Fernandes L, Castañeda-Zegarra S., Rodriguez-Fernandez M, del Mazo J & Moreno R. D. (2018) **Differential Effects of Exposure to Single versus a Mixture of Endocrine-Disrupting Chemicals on Steroidogenesis Pathway in Mouse Testes.** *Toxicological Sciences, 161(1), 76–86, DOI: 10.1093/toxsci/kfx200*

26. Klett H., Rodriguez-Fernandez M., Dineen S., Leon L. R., Timmer J., & Doyle III F. J. (2015) **Modeling the Inflammatory Response in the Hypothalamus ensuing Heat Stroke: Iterative cycle of Model Calibration, Identifiability Analysis, Experimental Design and Data Collection.** *Mathematical Biosciences, 260:35-46, DOI: 10.1016/j.mbs.2014.07.011*

27. Thakur G. S., Daigle Jr B. J., Dean K. R., Zhang Y., Rodriguez-Fernandez M., Hammamieh R., Yang R., Jett M., Palma J., Petzold L. R., & Doyle III F. J. (2015) ***Systems Biology Approach to Understanding Post-Traumatic Stress Disorder.*** *Molecular BioSystems, 11(4):980-993, DOI: 10.1039/C4MB00404C*

28. Aschbacher K., Rodriguez-Fernandez M., Jain S., van Wietmarschen H., Doyle III F. J. & van der Greef J. (2014) **The Hypothalamic-Pituitary-Adrenal (HPA)-Leptin Axis and Metabolic Health: Proof of Concept of an Applied Dynamic Systems Model.** *Interface Focus, 4(5), 20140020, DOI: 10.1098/rsfs.2014.0020*

29. Hussain S., Rodriguez-Fernandez M., Brown G., Doyle III F. J. & Ruoslahti E. (2014) **Quantity and accessibility for specific targeting of receptors in tumors.** *Scientific Reports, 4:5232, DOI: 10.1038/srep05232*

30. Heermann R., Zigann K., Gayer S., Rodriguez-Fernandez M., Banga J. R., Kremling A. & Jung K. (2014) **Dynamics of an interactive network composed of a bacterial two-component system, a transporter and K+ as mediator.** *PLoS ONE, 9 (2), e89671, DOI: 10.1371/journal.pone.0089671*

31. Leon L. R, Dineen S., Blaha M. D., Rodriguez-Fernandez M. & Clarke D. (2013) **Attenuated Thermoregulatory, Metabolic and Liver Acute Phase Protein Response to Heat Stroke in TNF Receptor Knockout Mice**. *American Journal of Physiology, 305(12):R1421-32, DOI: 10.1152/ajpregu.00127.2013*

32. Rodriguez-Fernandez M., Grosman B., Yuraszeck T., Helwig B. G., Leon L. R. & Doyle III F. J. (2013) **Modeling the Intra- and Extracellular Cytokine Signaling under Heat Stroke in the Liver.** *PLoS ONE, 8(9):e73393, DOI: 10.1371/journal.pone.0073393*

33. Rodriguez-Fernandez M., Rehberg M., Kremling A. & Banga J. R. (2013) **Simultaneous model discrimination and parameter estimation in dynamic models of cellular systems.** *BMC Systems Biology, 7:76, DOI: 10.1186/1752-0509-7-76*

34. Sriram K., Rodriguez-Fernandez M & Doyle III F. J. (2012) **A detailed modular analysis of heat-shock protein dynamics under acute and chronic stress and its implication in anxiety disorders.** *PLoS One, 7(8):e42958, DOI: 10.1371/journal.pone.0042958*

35. Rodriguez-Fernandez M., Banga J. R. & Doyle III F. J. (2012) **Novel global sensitivity analysis methodology accounting for the crucial role of the distribution of input parameters: application to systems biology models.** *International Journal of Robust and Nonlinear Control, 22(10):1082-1102, DOI: 10.1002/rnc.2797*

36. Sriram K., Rodriguez-Fernandez M & Doyle III F. J. (2012) **Modeling cortisol dynamics in the neuro-endocrine axis distinguishes normal, depressed, and post-traumatic stress disorder (PTSD) in humans.** *PLoS Computational Biology, 8(2):e1002379, DOI:10.1371/journal.pcbi.1002379*

37. Rodriguez-Fernandez M.*, Cardelle-Cobas A.*, Villamiel M. & Banga J. R. (2011) **Detailed Kinetic Models Describing Lactulose Hydrolysis and Oligosaccharide Synthesis Using Different β-Galactosidases.** *Journal of Biotechnology, 153:116-124, DOI: 10.1016/j.jbiotec.2011.03.012*

38. Yuraszeck T. M., Neveu P., Rodriguez-Fernandez M., Robinson A., Kosik K. S. & Doyle III F. J. (2010) **Vulnerabilities in the Tau Network and The Role of Ultrasensitive Points in Tau Pathophysiology.** *PLoS Computational Biology, 6(11):e1000997, DOI: 10.1371/journal.pcbi.1000997*
39. Rodriguez-Fernandez M. & Banga J. R. (2010) **SensSB: A software toolbox for the development and sensitivity analysis of systems biology models.** *Bioinformatics, 26(13):1675-1676, DOI: 10.1093/bioinformatics/btq242*
40. Kucherenko S., Rodriguez-Fernandez M., Pantelides C. C. & Shah N. (2009) **Monte Carlo evaluation of Derivative based Global Sensitivity Measures.** *Reliability Engineering & System Safety, Vol. 94, 1135-1148, DOI: 10.1016/j.ress.2008.05.006*
41. Rodriguez-Fernandez M., Balsa-Canto E., Egea J. A. & Banga J. R. (2007) **Identifiability and Robust Parameter Estimation in food process modelling: application to a drying model.** *Journal of Food Engineering, 83(3):974-383, DOI: 10.1016/j.jfoodeng.2007.03.023*
42. Balsa-Canto E., Rodriguez-Fernandez M. & Banga J. R. (2007) **Optimal design of dynamic experiments for improved estimation of kinetic parameters of thermal degradation.** *Journal of Food Engineering, 82(2):178-188, DOI: 10.1016/j.jfoodeng.2007.02.006*
43. Egea J. A., Rodriguez-Fernandez M., Banga J. R. & Marti R. (2007) **Scatter Search for Chemical and Bio-Process Optimization.** *Journal of Global Optimization, 37(3):481-503, DOI: 10.1007/s10898-006-9075-3*
44. Rodriguez-Fernandez M., Egea J. A. & Banga J. R. (2006) **Novel Metaheuristics for Parameter Identification in Nonlinear Dynamic Biological Systems.** *BMC Bioinformatics, 7:483, DOI: 10.1186/1471-2105-7-483*
45. Rodriguez-Fernandez M., Mendes P. & Banga J. R. (2006) **A Hybrid Approach for Efficient and Robust Parameter Estimation in Biochemical Pathways.** *BioSystems, 83:248-265, DOI: 10.1016/j.biosystems.2005.06.016*

TEACHING EXPERIENCE

IBM-3104: **Statistical Methods for Biological and Medical Engineering.** Pontificia Universidad Católica de Chile, (graduate: 2019-2, 2020-2, 2021-2, 2022-2, 2023-1).

IBM-3101: **Advanced Topics in Biological and Medical Engineering I.** Pontificia Universidad Católica de Chile, (graduate: 2019-1).

IBM-1005: **Introduction to Biomedical Engineering.** Pontificia Universidad Católica de Chile, (undergraduate: 2017-1, 2018-1).

IBM-2012: **Physiological Monitoring and Data Analysis**. Pontificia Universidad Católica de Chile, (undergraduate: 2016-2, 2017-2, 2018-2, 2019-2, 2020-2, 2021-2, 2022-2, 2023-1).

IIQ-3733: **Biosystems Analysis**. Pontificia Universidad Católica de Chile, (graduate: 2016-2, 2017-1).

ING-1023: **Physiological Monitoring in the IoT Era,** Internet of Things and the Industry 4.0 Diploma, Pontificia Universidad Católica de Chile, (2017-2, 2018-2, 2019-2).

MENTORING EXPERIENCE

M.Sc. Thesis advisor: María Emilia Frésard Petit-Laurent (2017-2019), Alexis Suárez Pinto (2018-2019), Axel Sepúlveda (2019-2021), Diego de la Vega (2020-2022), Rafael Kaempfer (2022-present), Nicolás San Martín (2023-present).

PhD. Thesis advisor: Ishani Thakkar (2018-2022), Javiera Cortés (2019-2023), Martín Miranda (2019-2023), Carlos Valle (2019-2023), Gabriela Vargas (2019-2023), Rayen Valdivia (2020-present), Daniel Solomons (2020-present), Valeria Páez (2022-present), Andrea Marimán (2023-present).

THESIS COMMITTEES

M.Sc. Thesis committees: Francisco Saitua (2016, UC), Rodrigo González (2017, UC), Kritsye Leiva (2017, UC), Francisco Pinto (2017, UC), Francisco Fouere (2021), Nawel Cariman (2021).

PhD. Thesis committees: Pierre Chelle (2017, Ecole des Mines de Saint-Etienne, France), Henry Humberto León Ariza (2017, Universidad de La Sabana, Colombia), Rodrigo Santibáñez (2020, UC), Vicente Medel (2021, UC).

REVIEWING EXPERIENCE

Journal reviewer: Bioinformatics, Bioprocess and Biosystems Engineering, BMC Systems Biology, Cells, Communications in Nonlinear Science and Numerical Simulation, Complexity, Computers & Chemical Engineering, IEEE/ACM Transactions on Computational Biology and Bioinformatics, IET Systems Biology, Industrial & Engineering Chemistry Research, Reliability Engineering & System Safety, Physical Biology, PLoS Computational Biology, Statistics and Computing, Water Research, Physical Biology, Journal of Biological Rhythms, International Journal of Medical Informatics.

Review Editor in **Frontiers in Physiology**; **Guest Associate Editor** in **Frontiers in Endocrinology**.

CONICYT reviewer for FONDEF, FONDECYT and FONDEQUIP grants.

2019- 2021: Member of the "Engineering 2" FONDECYT study group.

HONORS AND AWARDS

2022 U21 **MidCareer** Researcher Programme 2022

2021 **UC Teaching Excellence Award.**

2012 **Licensed as Assistant Professor (Profesora Contratada Doctora)** by the Spanish National Agency for Quality Assessment and Accreditation (**ANECA**). PCD#: 2012-208

2007 **Extraordinary doctorate award,** "Premio extraordinario de doctorado".