Luismar Marques Porto

- Systems Biology
- Applied Genomics
- Tissue Engineering
- (Webmaster &
- Networking, just for fun!)

Prof. Luismar Marques Porto

Associate Professor, P.I.
Genomic Engineering Group Leader / InteLAB Supervisor

B.S. Chemical Engineering (1980), FURB, Blumenau-SC, Brazil
M.S. Physical Chemistry (1987), UFSC / COPPE-UFRJ, Rio de Janeiro-RJ, Brazil
Ph.D. Chemical Engineering, Northwestern University, Evanston-IL, USA (1993)
Visiting Scholar Biomedical Engineering (2001-2002) The University of Queensland, Brisbane-QLD, Australia

Visiting Scholar Biomedical Engineering Center (2007-2008) Harvard-MIT Health Sciences & Technology Division, Cambridge-MA, USA

(See Short Bio below). Curriculum vitae, CNPq Lattes Platform (in Portuguese)

Full CV in English (PDF) LinkedIn Public Profile

We are interested in integrating biological sciences and engineering concepts to advance biomedical applications, particularly in the field of molecular tissue engineering.

Integration is being accomplished by combining post-genomics bioinformatics and other systems biology tools (for instance, metabolic engineering analysis), either developed within the group or taken elsewhere, with biomaterials and bioactive molecules produced by genetically modified microorganisms. We call this approach "genomic engineering"!

Molecular tissue engineering, the end product of the genomic engineering conceptual framework, deals with the idea of using extensive molecular information, in particular those coming from "omics" projects, to develop novel approaches to tissue engineering problems.

We are particularly interested in designing advanced biomaterials to serve as 2-D or 3-D templates (films and scaffolds) from basic principles, to develop tissue engineering medical products.

Genomic engineering studies in our group is also applying GE concepts to optimize biotechnological applications such as the production of new drugs, cleaner energy (biohydrogen) and molecular diagnostic protocols.

Eukaryotic genomic engineering is out of our reach by now, but we are trying to extend what we have learned from bacterial systems to a particular human case: the Fragile X Syndrome (FXS). FMRP, the FXS related protein has been revealed a very interesting model system, and efforts are being done in the group to model FMRP-RNA interactions and to determine some energy parameters that might be useful for future systems biology studies. Meanwhile, molecular diagnostics methods are being tested and improved and some neurochemistry assays are being carried out using animal models.
Luismar Porto's Short BioEDUCATION Luismar M. Porto received his Bachelors degree in Chemical Engineering from Universidade Regional de Blumenau, and Masters degree in Physical Chemistry from Federal University of Santa Catarina-UFSC (Florianópolis, SC)/COPPE-UFRJ (Rio de Janeiro, RJ), Brazil, and then his Ph.D. in Chemical Engineering from Northwestern University, Evanston, IL, USA. His Master’s thesis dealt with catalyst tests and development to produce long chain oxygenates and hydrocarbons from synthesis gas. His doctoral thesis concentrated on the study of catalyst deactivation and packed bed reactor modeling using sulfur and coke-generating compounds on benzene hydrogenation. POST-DOCTORAL TRAINIG More recently, Prof. Porto has spent one year as a post-doc at the Chemical Engineering Department at the University of Queensland - Brisbane, Australia, where he has acquired basic skills in the area of Biological and Biomedical Engineering. He now holds an appointment as Visiting Scientist/Scholar at the Massachusetts Institute of Technology, at the Harvard-MIT Division of Health Sciences & Technology, Biomedical Engineering Center, Cambridge, MA, USA. Prof. Porto is currently an Associate Professor of the Federal University of Santa Catarina (UFSC), one of the leading academic and research institutions in Brazil. LABORATORY At UFSC, Prof.

Porto was part of the group that has founded the Chemical and Food Engineering Department, where he has served as its Head of Department, the Masters Program in Chemical Engineering, which he has served as a Chairman, and the Doctoral Program in Chemical Engineering. At UFSC he supervises the Integrated Technologies Laboratory (www.intelab.ufsc.br) and leads the Genomic Engineering Group, an inter-institutional research group with interests in advanced biotech products. He is also a collaborator of the Human Resources Program in Gas & Oil, a joint program with the Mechanical Engineering Department at UFSC, funded by the Brazilian National Oil Agency (ANP) and Petrobras, and at the Materials Sciences and Engineering Graduate Program. TEACHING Prof. Porto’s teaching interests reflect his broad education in virtually all areas of Chemical Engineering. During his career, Prof. Porto has taught the following undergraduate courses: Introduction to Chemical Engineering, General Technological Chemistry, Equipment Design, Introduction to Chemical Processes, Process Control and Simulation, Chemical Industries, Petrochemistry, Chemical Reaction Engineering, Transport Phenomena, Thermodynamics, Process Design, Introduction to Genomic Engineering; in the graduate program (Masters and PhD), the following courses: Thermodynamics, Heterogeneous Chemical Reactors, Fundamentals of Surface Chemistry and Heterogeneous Catalysis, Engineering and Design of Chemical Reactors, Chemical Process Kinetics, Genomics and Bioinformatics, Metabolic Engineering, Catalyst Deactivation, Fundamentals of Genomic and Biomedical Engineering, Fundamentals of Cellular and Molecular Biology for Biochemical Engineering, Tissue Engineering (Courses in bold have been taught for at least three times). RESEARCH Prof. Porto’s research interests combine his scientific and engineering training and expertise. His work falls in a variety of general categories including chemical reaction engineering, thermodynamics, and biological/biomedical problems. For the last seven years Prof. Porto has also been involved in research and educational projects that bring post-genomics information and technologies to the field of biological and biomedical engineering. Particular efforts have been done by his group in order to understand fundamental aspects of gene structures and organization in bacterial biopolymer synthesis and hydrogen production, the role of transcription factors in regulating protein expression, and how secondary metabolite production may be optimized using metabolic engineering and other systems biology tools. In the Federal University of Santa Catarina (UFSC), and now at Harvard-MIT, Prof. Porto is leading an interdisciplinary team that is interested in several tissue engineered biomedical technologies, including novel designs of drug-eluting stents, based on pharmacogenomics data and computational fluid dynamics (CFD) analyses. BIOTECH On the biotechnology front, interests ranges from hydrogen production by engineered bacteria, micro/nano bacterial cellulose fibers and composites for biomedical applications (Patent pending) and polyhydroxyalkanoate production.Prof. Porto has published more than one hundred scientific works in international journals and conference proceedings. He has been supervisor of post-docs, PhD thesis (ten), Masters thesis (twenty) and more than 40 undergraduate students.Prof. Porto has been invited to several distinguished talks and conferences, and has received several awards and students recognition for his work on behalf of the chemical engineering education. HONORS Recently he was the major invited speaker at the Brazilian National Education Conference in Chemical Engineering (ENBEQ), the first Brazilian honored with such invitation in more than 20 years. Also recently he was honored by the Class of 2007 as “The Name of the Class” of the Chemical Engineering undergraduate program at UFSC. Last year his group has won the X-Meeting 2007 Best Poster Award. The work on "Theoretical and Computational Modeling of Paclitaxel (Taxol®) Action on the Cell Cycle of Smooth Muscle Cells" was presented during the 3rd International Conference of the Brazilian Association of Bioinformatics and Computational Biology and received "recognition of an outstanding presented work". CONSULTING Prof. Porto has been a consulting professional for several companies in the area of chemical engineering processes, including BRASKEM S.A. (NYSE:BAK), a leading petrochemical company in South America, and BUNGE ALIMENTOS S.A. (NYSE:BG), a leading producer of food, and grains such as soy and wheat.In his “free” time he enjoys playing with Internet servers (Windows and Linux) and web developments (wikis and CMS). He has experience programming in FORTRAN, C/C++, Visual Basic, MATLAB, PHP/MySQL, and some exposure to CFX, OpenFOAM and other Computational Fluid Dynamics and general software.