

Suélia de Siqueira Rodrigues Fleury Rosa, PhD

Associate Professor, Department of Biomedical Engineering, University of Brasília, Brazil

Research Scientist in Biomedical Engineering and Tissue Engineering

Lattes ID: 1154673226500318 • ORCID ID: 0000-0002-1247-9050

E-mail: suelia@unb.br • WhatsApp Business: +556199293.4436

Background: Professor and Researcher in Latin America, located in the Center-West microregion of Brazil. Has 16 years of experience. She has demonstrated its capacity to build innovative equipment applied to national health. She holds more than 18 patents and has engaged in dialogues with the state and private environments, taking her research to society.

Summary: Holds master's and PhD degrees and has engaged in post-doc education. Extensive experience in scientific initiation training. Highly motivated professional, knowledgeable in technology, Exceptional analytical skills. Extensive experience in the development and management of research groups. Energetic activity in local society, taking engineering to public schools, involving associations and universities, and expanding work and development networks. Has taught subjects such as circuit practices, digital control, and biocomplex systems. influences young students, especially women, teaching undergraduate students, and mentoring students in their final graduation project work. It works to increase institutional indicators, promoting collaborative, voluntary work in societies and constant interaction with the private sector through patent applications and licensing. The Brazilian state is always seeking to work with parliamentary support in projects involving ecology and public policies for small producers (use of biomaterials from natural sources such as Latex from rubber trees and chitosa from crystals).

Earned Degrees

PostDoc human-machine interface	Media Lab no Massachusetts Institute of Technology	2013
Ph.D. Eletronic Engineering and Biomedical	University of Brasília	2008
M.S. Eletronic Engineering	Technological Institute of Aeronautics	2005
B.S. Eletronic Engineering	University State Paulista Júlio Mesquita Filho	2003

Employment History

Fellow	Brazilian Society of Biomedical Engineering (SBEB)	2018-2020 and 2022-present
Senior Member	Institute for Electrical and Electronics Engineers (IEEE)	2021-present
Fellow Committe	Nonlinear and Chaotic Phenomena is a technical committee of the Brazilian Society of Mechanical Sciences and Engineering (ABCM)	2014-present
Associate Member	Brazilian Diabetes Society	2017-present
Member	Racial heteroidentification committee	2018-present
Pro-coordination of Research	BEM-TE-VI Platform aims to provide services people with disabilities	2021-present
Fellow	Brazilian Society of Professionals in Clinical Research	2018-2020 and 2022-present
Permanent member	Committee for Ethics in Research with Human Beings. Faculty of Health Sciences. University of Brasilia	2013-2019

A brief history of the latin woman in the construction of a scientific career

Has received all her education and training in public schools. Dreamed of being a scientist from early childhood. She is proud to point out that her children also study at public institutions and follow this path. Her parents had no higher education, and her father was illiterate, so her parents saw education as her chance to build a better future. She always wanted to grow and see other worlds, and always wanted to pursue her studies outside the state. She was not intimidated by being a black woman from a low-income family in Goiás. In 1997, she began her path to becoming a scientist and engineer when she went to São Paulo to start her education. A pioneering spirit has always been one of her outstanding characteristics, as a student and in her future as a professional. She acts with discipline, commitment, and humility.

Honors and Awards

International or National Awards

EMBS Distinguished Lecturer - EMBS Senior Program Specialist	2023
Indicated for the Péter Murányi Award	2022
Honorable Mention in the Mercosul Prize for Science and Technology	2022
FAPDF Award of Science, Technology and Innovation - Foundation for Support and Research of the Federal District	2022
Certificate of Honorable Mention - IEEE Engineering in Medicine and Biology Society	2021
Annual Health Award - Ministry of Public Health, National Level	2019
Annual Health Award - Ministry of Public Health, State Level	2019
Nise da Silveira Award - III Symposium on Health Sciences and Technology	2019
Incentive Award in Science, Technology and Innovation for the Unique Health System - Ministry of Health	2017
Young Inventors Award - Foundation for Support and Research of the Federal District	2011 and 2009
Santander Awards for Entrepreneurship and Science and Innovation in Biotechnology	2008

Institute or School Awards

Marco Antônio Raupp Innovation Prize - University of Brasília	2022
Lourdes Mattos Brazil Award - University of Brasília	2021 and 2022
University of Brasilia Award for Dissertation and Thesis	2015-2017
Albert Einstein Innovation Award - University of Brasília	2017
Honorable Mention, Science and Culture and Citizenship - 19th Congress of Scientific Initiation of the University of Brasilia	2013

Five Best Research Products (of 171 total journals, 6 Organized published books, 26 Chapters of books published, 87 Full papers published in conference proceedings, 15 Abstracts published in conference proceedings)

1. DA FONSECA, RONEI DELFINO ; SANTOS, PAULO ROBERTO ; MONTEIRO, MELISSA SILVA ; FERNANDES, LUCIANA ALVES ; CAMPOS, ANDREIA HENRIQUE ; BORGES, DÍBIO L. ; ROSA, SUÉLIA DE SIQUEIRA RODRIGUES FLEURY . Parametric evaluation of impedance curve in radiofrequency ablation: A quantitative description of the asymmetry and dynamic variation of impedance in bovine ex vivo model. PLoS One, v. 16, p. e0245145, 2021.
2. RODRIGUES, Suélia de Siqueira Fleury Rosa; Rosa, M. F. F. ; Marques, M. P. ; GUIMARÃES, G. A. ; MOTTA, B. C. ; MACEDO, Y. C. L. ; INAZAWA, P. ; DOMINGUEZ, A. ; Macedo, F. S. ; LOPES, C. A. P. ; DA ROCHA, A. F. . Regeneration of Diabetic Foot Ulcers Based on Therapy with Red LED Light and a Natural Latex Biomembrane. ANNALS OF BIOMEDICAL ENGINEERING, v. 47, p. 1153-1164, 2019.
3. DELIS L. A. ; ROSA, S.S.R.F. ; SOUZA, P. ; CARNEIRO, M. L. B. ; ROSA, M. F. F. ; MACEDO, Y. ; SOUZA, F. H. V. ; ROCHA, A. F. . Characterization of the Cicatrization Process in Diabetic Foot Ulcers Based on the Production of Reactive Oxygen Species. Journal of Diabetes Research, v. 2018, p. 1-10, 2018.
4. DELFINO, R. ; MONTEIRO, M. ; MARQUES, M. P. ; MOTTA, B. ; ANJOS, G. ; SANTOS, P. R. ; JACOBI, R. ; ROSA, S.S.R.F. . Roll-Off Displacement in Ex Vivo Experiments of RF Ablation With Refrigerated Saline Solution and Refrigerated Deionized Water. IEEE Transactions on Biomedical Engineering, v. 66, p. 1390-1401, 2019.
5. ROSA, SUELIA DE SIQUEIRA RODRIGUES FLEURY; DA SILVA, ANA KAROLINE ALMEIDA ; DOS SANTOS, CAROLINA RAMOS ; SILVA, MAYLA DOS SANTOS ; PERILLO, ANA LUÍSA PEREIRA ; MENDONÇA, ARTHUR FARIA ; Rosa, Mario Fabrício Fleury ; SAMPAIO, THATIANE LIMA ; Carneiro, Marcella Lemos Brettas ; ROCHA, JOSÉ CARLOS TATMATSU ; PIRATELLI-FILHO, ANTÔNIO ; DE OLIVEIRA, ALLISSON LOPES . Effects of vaccine registration on disease prophylaxis: a systematic review. Biomedical Engineering Online, v. 21, p. 1-26, 2022.

Industry / Start-Up Experience

2020-present	Consultant for production products - Life Care Medical Company.
2014-2015	Manager in the Construction of the Laboratory for Certification of Electromedical Equipment (TED 116/2009) - RDC No. 189, July 18, 2003.
2011-present	Consultant for medical product production at TAAAI Nucleus - Assistive Technology, Accessibility, Autonomy and Inclusion

Selected Grants & Contracts

Researcher with a productivity grant in technological development and innovative extension current at CNPq.

• Financing over \$400,000

VERA Equipment: The objective was to develop a Remote Monitoring Device for Biomedical Equipment. Sponsored by the Ministry of Health and the Department of the Industrial Complex and Innovation in Health, Brazil. (DECIIT/MS).

SOFIA Equipment: The objective of this project was to evaluate the influence of the capacitive reactance present in pigs post mortem liver tissue in a FRA system, building a FRA hardware capable of measuring phase shift, proposing a tissue classification model and dynamically adjusting the frequency equipment to correct the impedance match without the need to change filters. Sponsored by the Ministry of Health and the Department of the Industrial Complex and Innovation in Health, Brazil. (DECIIT/MS).

RAPHA Equipment: The objective of this project was to develop, improve and make viable the portable medical device called Adhesive Natural Latex (*Hevea Brasiliensis*) associated with the LED light emitting circuit in the treatment of wounds and tissue healing for diabetics. Sponsored by the Ministry of Health and the Department of the Industrial Complex and Innovation in Health, Brazil. (DECIIT/MS).

- **Financing under \$300,000**

Orga-on-a-chip Project: This objective is the development, re-function, modeling and analysis of the vascularization process using Organ-on-a-chip and mechanobiology to extend photobiostimulation therapy associated with biomaterials applied to chronic wounds in the skin. Promoted by Fundação de Amparo e Pesquisa do Distrito Federal (FAP/DF) and University of Brasília, Brazil.

- **Financing under \$50,000**

VESTA Facial Respirator: Mask with Nanotechnology for Filtering COVID 19. Promoted by the Federal Government Support and Research Foundation Federal District (FAP/DF) and University of Brasília, Brazil.

Project Coordination Experience

VESTA Project. Personal Protective Equipment (PPE) – PFF2 Facial Respirator with an extra layer of chitosan nanoparticle protection. VESTA Mask. (Financing)

Research Period: 2020 – 2022.

Objective: In this study, we aimed to compare the virus filtration efficiency, especially SARS-CoV-2, in masks containing chitosan nanofilms in relation to the standard N95 mask used by health professionals.

It is hypothesized that the mask with nanomaterials will reduce the contamination of the user by SARS-CoV-2, since it will have an extra filter formed by ultrafine pores, in addition to having a surface with virucidal activity. The innovation of the product presented encompasses the fusion of knowledge of nanofilms, already consolidated in the literature, associated with a mask, made within the technical and normative molds specific to the category in which it will be used.

Degree of Technological Maturity: TRL 09

Translational Health Research (PTS): Time T4 (Embedded in the health system).

Patent: BR 10 2021 007808 1. 4/23/2021. Dynamic respirator with multifunctional properties to prevent infectious diseases with self-cleaning and drug delivery properties. FUB / UFCC. Technological Transfer to Industry on 12/20/2021.

ANVISA Registration No. 82332400010 - 03/13/2022.

VERA Project. Remote Monitoring Equipment for Biomedical Equipment. (Financing)

Research Period: 2013-2017

Objective: Development of Remote Monitoring Equipment for Biomedical Equipment.

Degree of Technological Maturity: TRL 4 Research

Translational in Health (PTS): Time T1 (pre-clinical).

Patent: Patent application entitled "Continuous monitoring system for hospital equipment", filed with the INPI on 02/14/2017 under definitive number BR 10 2017 002919 0; Computer program entitled "Vera" filed with the INPI on 07/14/2016, under definitive number BR 51 2016 000905 5.

Sofia Project. Hepatic Ablation Equipment - Construction of medium-complexity medical equipment applied in the treatment of tumors using radiofrequency. (Financing)

Research Period: 2013 - Current

Objective: ARF aims to heat in a controlled manner tumor cells that are more sensitive to temperature when compared to healthy cells. The limitation in the propagation of the volume is due to the characteristics of the tissue, which may have large blood vessels close to the target region, acting as dissipators of the generated heat. In this sense, combined ARF techniques have been widely studied, but they are not capable of homogeneously determining which is the best ARF treatment. The objective of this project is related to the evaluation of the influence of the capacitive reactance present in the post-mortem porcine liver tissue in an ARF system, through the construction of an ARF hardware capable of measuring the phase shift, proposing a model of tissue classification and dynamic adjustment of equipment frequency to correct impedance matching without the need for switching filters.

Degree of Technological Maturity: TRL 04

Translational Health Research (PTS): Time T1 (pre-clinical)

Patent: Patent application entitled "Radiofrequency liver ablation system containing electronically controlled equipment and an umbrella-shaped electrode made of shape-memory alloy and its method of processing and analyzing medical images", filed with the INPI on 09/02 /2017 under definitive number BR 10 2017 002683 3; Computer program entitled "Hepatic ablation software" filed with the INPI on 07/14/2016, under definitive number BR 51 2016 000906.

Technology Transfer Process in Progress

Raph Project. Portable Medical Equipment for Tissue Neof ormation of Lower Limbs. (Financing)

Research Period: 2016 - 2020

Objective: The objective of this project is to develop, improve and enable the portable medical device called Adhesive Derived from Natural Latex (*Hevea Brasiliensis*) associated with the LED light emitting circuit in the treatment of wounds and tissue healing for diabetics. This project is the continuation of research carried out within the scope of the Laboratory of Engineering and Biomaterial (BioEngLab) of the University of Brasília, Gamma College. This is the last phase of the consolidation process of the portable medical device for treating wounds and tissue healing for diabetics supported by the Ministry of Health's (MS) investment and intervention logistics.

Degree of Technological Maturity: TRL 09 (Regulatory Phase - Inmetro and Anvisa)

Translational Health Research (PTS): Time T3 (incorporation in the health system)

Patent: PI 1103692 3. 7/18/2011. Cushioning insole for diabetic feet. PI 1103691 5 7/18/2011 Sensory insole for diabetic feet. PI 1103690 7. 7/18/2011. Healing insole for diabetic feet. BR 10 2016 019963 8. 8/29/2016. Microperforated adhesive made of latex, associated with LED light sources for direct application in internal and external human inflammatory processes. BR 13 2021 001944 0. 2/2/2021. Latex-based biomembranes (*Hevea brasiliensis*) containing liposomes with curcumin (*Curcuma longa*) and papain (*Carica papaya*) and their use associated with led therapy for the treatment of chronic ulcers and diabetic wounds. BR 10 2022 007175 6. 4/13/2022. Portable photodynamic therapy transducer for use on infected diabetic foot wounds.

Technological Transfer to Industry on 01/10/2023.

Organ-on-a-chip project. To establish the relationship between the microfluidics of the vascularized tissue through angiogenesis and vasculogenesis stimulated by the application of the photobiostimulation system, associated with the latex membrane, through the development of feature extraction techniques using organ-on-a-chip. (Financing)

Survey Period: 2021-current.

Objective: As secondary objectives, it is also intended to: I) evaluate the degree of proliferation and migration of the vascularization process and its maintenance in the proliferative phase; II) to quantify the impact of traumatic load and strain rate on satellite vessels? through simulated mechanical events and III) generate a performance indicator to mediate the occurrence of angiogenesis and vasculogenesis with the stimulation of photobiostimulation and latex biomaterial and with that IV) help both for a better understanding of vascularization processes in this scenario and in the development of new applications.

Degree of technological maturity: TRL 04

Translational Health Research (PTS): Time T0 (concept).

Patent: in progress.

CETER Project. Intraesophageal controller with active thermal conduction derived from the natural latex biomaterial of *Hevea brasiliensis* associated with nanoparticles applied in the prevention of atrioesophageal fistula to maximize the safety of radiofrequency cardiac ablation.

Research period: 2018 - current.

Objective: The currently most used technique for the treatment of Atrial Fibrillation (AF) is cardiac ablation with radiofrequency catheter (RFCA). One of the possible unwanted effects that may occur after this procedure is the formation of an atrial-esophageal fistula (AEF), which occurs when there is perforation by heating the wall of the left atrium, leading, in some cases, to the formation of what may become a communicating tube between the atrium and the esophagus. EAF and lesions on the esophageal wall are serious complications that can lead to death. The project aims to implement equipment derived from a polymer-based biomaterial, latex (*Hevea Brasiliensis*), called LUIZA. This consists of an esophageal module that is capable of cooling, monitoring and controlling the temperature in the esophagus during the ACRF procedure, and obtaining data that can help in the development of a system that allows the prevention of esophageal injuries. Preventing these injuries from happening has a strong impact on the longevity of these patients.

Degree of Technological Maturity: TRL 04

Translational Health Research (PTS) Time: T1 (pre-clinical)

Patent: BR 10 2021 007185 0 4/15/2021 Esophageal temperature and cooling controller (ceter) and its use during cardiac ablation procedure with radiofrequency. BR 30 2022 006116 6. 8/11/2022. Configuration applied to/in esophageal temperature and cooling controller.

Anna Project. Early Respiratory Change Analyzer.

Research Period: 2021-2022

Objective: The Anna project, through microelectronics and signal processing techniques, aimed to monitor the vital sign related to the respiratory rate of an individual. The prototype measured the respiratory rate of a human being and made this data available through an interface that was easy for the user to understand. Thus, the study was committed to presenting the theoretical concepts regarding this vital sign associated with the techniques used to measure the frequency.

Degree of Technological Maturity: TRL03

Translational Health Research (PTS) Time: T1 (pre-clinical)

Patent: in progress.

Professional Experience:

- University of Brasilia - UnB, Associate Professor, 2005-present.
- Coordinator of the Graduate Program in Biomedical Engineering (PPGEB), Faculdade Gama, UnB, in two administrations 2017-2019.
- Industrial Automation Engineer, SIEMENS Ltda Company, 2001-2003.
- Professor at the Higher Education Institute of Brasília - IESB, 2005-2006.
- Research Biomedical Products SARAH Network of Rehabilitation Hospitals, 2006.
- Permanent member of the Human Research Ethics Committee - FS.
- Fellow of the Brazilian Society of Professionals in Clinical Research.
- Fellow of the Brazilian Society of Biomedical Engineering - SBEB.
- Fellow of the ABCM Committee of Nonlinear and Chaotic Phenomena.
- Associate Member of the Brazilian Diabetes Society - SBD.
- President of the Regional Chapter: R9 - Latin America Section: Central-North Brazil Section (2020-2022) - IEEE - Member
- Member of the following Societies : IEEE Electron Devices Society; Engineering in Medicine and Biology; Microwave Theory and Techniques; and Women in Engineering.
- Fellow of CNPq (National Council for Scientific and Technological Development) productivity and technological development since 2014.