



CLÁUDIA BUGA

Ph.D. in Materials Engineering

& Msc. in Biomedical Engineering

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About

Ph.D. in Materials Engineering, with over 5 years of experience in sensitive materials, formulation, sensor design, and electrochemical processes. Skilled in functional ink / composites formulation, electrical characterization, and the design, fabrication, and optimization of sensors using printed electronics (screen, inkjet, and direct ink writing) with tailored pre-/post processing. Experienced in envisioning, printing, and characterizing sensors from single units to complex multisensor arrays, bridging materials with electronics for scalable prototypes. Background includes simple acquisition circuitry, integration of COTS components with flexible sensors, and technology transfer through national R&D projects.

Education History

Oct 2020 - Feb 2026

PhD Student in Materials Engineering, Minho University

Title of PhD thesis: Development of a new concept for a Bioinspired Multisensing E-Skin

Sep 2012 - Mar 2018

Integrated Master's in Biomedical Engineering, University of Coimbra
Specialization in Instrumentation and Biomaterials

Title of Master Thesis: "More Efficient Nanossystems for Photodynamic Therapy"

Relevant Skills

• Technical and Research Skills

Fabrication: Screen printing, inkjet printing, direct ink writing, 3D printing;

Formulation: Carbon-based inks, electrolyte inks, polymer composites, sol-gel synthesis;

Characterization: SEM, FTIR, TGA, profilometry, EIS, cyclic voltammetry, UV-VIS spectroscopy, (electro)mechanical testing.

• Computational Skills

Basic Software: Office (Word, Excell and PowerPoint)

Specialized Software: Matlab, Processing, Arduino IDE, Circuit Maker, PSTrace, Inkscape, Origin, SPSS, Design Expert

• Soft Skills:

Dynamic, responsible, and highly adaptable to new challenges and environments.

Strong organizational, collaboration and project management abilities.

Creative, resilient, and detail-oriented, with strong scientific oral, writing and visual communication skills.

• Language Skills

Portuguese: Proficient (native language); English: Advanced (C1 certificate level);

Spanish: Advanced

Professional Experience

Mar 2020 - Present

Researcher at the Digital Transformation CoLab, Guimarães - Portugal

Projects: *Co-design and Co-development of Cyber Physical Systems & Be.Neutral*

- Research on organic and composite materials for printed electronics;
- Ink formulation using carbon-based composites – pressure, temperature, and humidity sensors;
- Screen printing of commercial inks (PEDOT:PSS, silver, carbon, electrolytes, dielectrics);
- Application of optimization methodologies (DoE) to ink formulation, printing, and sensor design;
- Design of screen-printed devices (sensor units, arrays, interconnects);
- Development of multisensing pressure matrices for object detection;
- Design and optimization of multi-segment electrochromic displays;
- Contribution to scientific publications (reviews, scientific articles, oral and poster presentations).

Nov 2018 - Nov 2019

Research Fellow | Mechanical Engineering Department, University of Coimbra | Project: *Add.Additive*

- Development and characterization of natural-based materials for 3D printing (PCL & PCL/cellulose composites);
- Prototyping and assessment of shape-memory properties in semi-crystalline printed materials.

Jul 2018 - Nov 2018

Research Fellow | Chemical Engineering Department, University of Coimbra | Project: *Demo@Polyfenton*

- Development of silica-metal polymeric complexes for wastewater treatment (Fenton process);
- Operation and scale-up of heterogeneous catalytic reactors to pilot scale;
- Material efficiency evaluation using UV-VIS, TOC, SEM-EDS.

Jun 2016 - Feb 2018

Research Intern at the Chemical Engineering Department, University of Coimbra

- Research on nanosystems for photodynamic therapy;
- Formulation of nanoemulsions and mesoporous silica nanocapsules (sol-gel method);
- Characterization: DLS, Zeta Potential, UV-VIS, SEM/TEM, TGA.

Selected Publications

- Buga, C. S., Viana, J. C., A Review on Materials and Technologies for Organic Large-Area Electronics. *Advanced Materials Technologies*. **2021**, 6;
- Buga, C. S., Viana, J. C., The role of printed electronics and related technologies in the development of smart connected products. *Flexible and Printed Electronics*, **2022**, 7(4), 43001;
- Buga, C. S., Viana, J. C. A Design of Experiments Study on Inkjet Printed PEDOT:PSS Temperature Sensors. *IEEE Sens. J.* **2024**, 1;
- Buga, C. S., Viana, J. C., Development and characterization of flexible carbon temperature sensors: a study on different inks and sensor designs. *Sensors and Actuators A: Physical*, **2024**, 115823;
- Costa, N. G., **Buga, C. S.**, Homem, N. C., Paleo, A. J., Sencadas, V., Viana, J. C., Gonzales, A., Antunes, J. C., & Rocha, A. M. (2025). Screen-printed textile substrates' suitability as a platform for electrochemical sensors' construction. *Journal of Electroanalytical Chemistry*, 976, 118805.
- Buga, C. S., & Viana, J. C. On the Development of Pressure, Temperature, and Humidity Sensors for Electronic Skins. *IEEE Journal on Flexible Electronics*, **2025**, 4(12), 460–467.

Selected Conferences

- Buga, C.S.*, Viana, J.C., LOPEC 2024. Oral presentation: On route to develop a novel smart e-skin: A study on the Materials, Designs and Printed Electronics Technologies, 5 – 7 March 2024, Munich, Germany.
- Buga, C. S. *, Viana, J. C., 2024 IEEE International Flexible Electronics Technology Conference (IFETC). Poster Presentation: A Study on Materials and Technologies for the Development of Pressure, Temperature, and Humidity Sensors for Electronic Skins, 16 – 18 September 2024, Bologna, Italy.
- Buga, C.S.*, Viana, J.C., Materiais 2025. Development of a Multisensing E-skin for Gripper Sensorization, 1 – 3 Julho 2025, Lisbon, Portugal.
- Buga, C. S.*, Pinheiro, T., Pedrosa, P., Viana, J. C., LOPEC 2026. Poster Presentation: Pursuing High-Contrast, Bistable Electrochromic Displays with Commercial Screen-Printing Inks, 24 – 26 February 2026, Munich, Germany.