Gabriel Toshiaki Tayama

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Education

03/2018-10/2023 **Université Laval, Ph.D. in Physics**

Centre d'Optique, Photonique et Laser

Thesis Title (Cotutelle): Development of hybrid sol-gel inks for additive manufacturing of photonic materials

Supervision: Prof. Tigran Galstian

03/2018-10/2023 **Universidade Estadual Paulista, Ph.D. in Chemistry**

Chemistry Institute of Araraquara, Brazil

Supervision: Prof. Younes Messaddeq

03/2013-12/2017 **Universidade Federal de Sao Carlos, B.S. in Materials Engineering – Ceramic Materials**

Materials Engineering Department

Thesis Title: Applications for metallic particles dispersed in glasses: non-linear optics, SPR and luminescence.

Supervision: Prof. Edgar Dutra Zanotto and Prof. Marcelo Nalin

Research Experience

12/2025-Present **Research Associate**

LRIO, Centre d'Optique, Photonique et Laser, Universite Laval, Canada

Principal Investigator: Prof. Simon Thibault

12/2023-12/2025 **Postdoctoral Fellow**

LRIO, Centre d'Optique, Photonique et Laser, Universite Laval, Canada

Project Title: Additive manufacturing of glasses for optical design.

Supervision: Prof. Simon Thibault

01/2015-02/2015 **Undergraduate Research Intern**

Brazilian Center for Research in Energy and Materials (CNPEM)

Project Title: Low cost and high throughput microfluidic devices: microfabrication and applications

Supervision: Ph.D. Renato Souza Lima

03/2013-02/2015	**Undergraduate Research Intern** ***Vitreous Materials Laboratory, UFSCar, Brazil*** **Project Title:** Obtaining transparent glass-ceramics from MAS (magnesium-aluminum-silicate) glass-systems with high mechanical properties **Supervision:** Prof. Edgar Dutra Zanotto, Prof. Leonardo Sant'Anna Galo and Prof. Mariana Carlos Villas-Bôas

Teaching Experience

07/2022-12/2022	**Private Tutoring (Chemistry)**
07/2016-01/2017	**Teaching Assistant (Ceramics Materials course)** *Materials Engineering Department, UFSCar, Brazil*
07/2016-01/2017	**Teaching Assistant (Materials Science II course)** *Materials Engineering Department, UFSCar, Brazil*

Awards

2nd place in the 2023 ISGS PhD Thesis Award

Peer-reviewing activities

Additive Manufacturing (IF:11.1)

Virtual and Physical Prototyping (IF:8.8)

Transition Metal Chemistry (IF:1.7)

Participation in scientific societies

Glass Additive Manufacturing International Consortium (GAMIC)

International Sol-Gel Society – ECR Member

Peer-reviewed journal publications:

Hiti, A.; Tayama, G. T.; Thibault, S. Magnetorheological elastomer-based deformable mirror using polydimethylsiloxane (PDMS) membrane. Optics Express **2026.** https://doi.org/10.1364/OE.589832

Nourizadeh Kazerouni, H.; Tayama, G. T.; Frechete, J.; Messaddeq, Y. New approach to 3D-print methacrylic acid/polyethylene glycol diacrylate-based membranes based on polymerization induced phase separation. Journal of Membrane Science **2026.** https://doi.org/10.1016/j.memsci.2025.125047

Tayama, G. T.; Costa, B. H.; Caixeta, F. J.; Murback Filho, R. P.; de Oliveira Junior, M.; Elias e Silva, L. T.; Messaddeq, Y.; Santagneli, S. H. Luminescent Eu3+ Doped Silicate-Aluminum-Borate Hybrid Materials Obtained by Photopolymerization of Sol-Gel Resins. *J Sol-Gel Sci Technol* **2025**. https://doi.org/10.1007/s10971-025-06813-6.

Tayama, G. T.; Parant, P.; Messaddeq, S. H.; Bélanger, E.; Marquet, P.; Galstian, T.; Thibault, S.; Messaddeq, Y. Optical Homogeneity and Anisotropy of 3D Printed Silicate-Aluminum-Phosphate Hybrid Sol-Gel Materials via Laser Scan Vat-Photopolymerization. *J Sol-Gel Sci Technol* **2025**. doi.org/10.1007/s10971-025-06812-7.

Costa, B. H.; Tayama, G. T.; Santagneli, S. H. Structural Evolution Study by Solid-State NMR of Photopolymerizable Aluminophosphosilicate Hybrid Materials. *Journal of Non-Crystalline Solids* **2024**, *639*, 123105. https://doi.org/10.1016/j.jnoncrysol.2024.123105.

Costa, B. H.; Tayama, G. T.; Rivera, V. A. G.; Messaddeq, Y.; Santagneli, S. H. Effects of the Thermal Treatment on Structural and Luminescence Properties of Er3+-Doped Aluminophosphosilicate Glasses Obtained by the Sol-Gel Method. *Journal of Alloys and Compounds* **2025**, 1010, 177112. https://doi.org/10.1016/j.jallcom.2024.177112.

Tayama, G. T.; Messaddeq, S. H.; Santagneli, S. H.; Messaddeq, Y. Correlation between Critical Energy, Penetration Depth, and Photopolymerization Kinetics in Aluminum–Phosphate–Silicate Hybrid Materials for Vat Photopolymerization. *Macromolecules* **2023**. https://doi.org/10.1021/acs.macromol.3c00363.

Tayama, G. T.; Santagneli, S. H.; de Oliveira Junior, M.; Messaddeq, Y. Understanding the Microstructure Connectivity in Photopolymerizable Aluminum-Phosphate-Silicate Sol–Gel Hybrid Materials for Additive Manufacturing. *J. Phys. Chem. C* **2023**. https://doi.org/10.1021/acs.jpcc.2c08027.

Posternak, M.; Tayama, G. T.; Messaddeq, S. H.; Messaddeq, Y. Process Modeling of Laser Scanning Vat-Photopolymerization Operating under Intermittent Exposure Conditions. *Additive Manufacturing* **2022**, *60*, 103234. https://doi.org/10.1016/j.addma.2022.103234.

Tayama, G. T.; Santagneli, S. H.; Eckert, H.; Pawsey, S.; Messaddeq, Y. Preparation and Structural Characterization of New Photopolymerizable Transparent Aluminum-Phosphate Hybrid Materials as Resins for 3D Printing. J. Phys. Chem. C **2020**, 124 (46), 25621–25631. https://doi.org/10.1021/acs.jpcc.0c08289.

Conference Papers:

Kalidoss Sudharsan, Ram Mohan Telikicherla, Denis Brousseau, Gabriel Tayama, Zhiyong Wang, Abhishek Patkar, David Aikens, Vikas Chandan, Sreekar Karnati, Xiaopeng Li, Baokai Cheng, Catherine Croson, Ben Walleshauser, Greg Radighieri, Dhanushkodi Durai Mariappan, and Simon Thibault. "DARPA ZENITH Liquid Mirror Telescope Program – Overview of Error Budget, Computational Modeling, and Control System Design." In American Society of Precision Engineering (ASPE) Annual Meeting. **2025.** doi.org/10.13140/RG.2.2.12006.08009.

Khan, Muhammad Younas, Sergio Celaschi, Thebano Emilio de Almeida Santos, Gabriel Toshiaki Tayama, Éric Bharucha, and Younès Messaddeq. “PtOEP Oxygen Sensitive Fluorescent Sensor Through Fiber Optic Bundles.” In 2024 Latin American Workshop on Optical Fiber Sensors (LAWOFS), 1–2**, 2024**. doi.org/10.23919/LAWOFS62242.2024.10561033.

Brousseau, D., S. Thibault, and Gabriel Tayama. “New Active Large Liquid Primary Mirror for Space Applications.” In Current Developments in Lens Design and Optical Engineering XXV, 13131:46–50. SPIE**, 2024**. doi.org/10.1117/12.3028923.

Santos, Maria Clara L., Muhammad Younas Khan, Michele Odnicki da Silva, Sergio Celaschi, Thebano Emilio de Almeida Santos, and Gabriel Toshiaki Tayama. “Effective Luminescent Sensor Element for Monitoring Dissolved Oxygen.” In 2024 SBFoton International Optics and Photonics Conference (SBFoton IOPC), 1–3, **2024.** doi.org/10.1109/SBFotonIOPC62248.2024.10813466.

Conference Presentations:

G. Tayama, P. Parant, S. H. Messaddeq, S. Thibault, T. Galstian, and Y. Messaddeq “Formation Mechanisms of Striae and Birefringence in Silicate-Aluminum-Phosphate Hybrid Sol-Gel Materials Processed via Laser Scan Photopolymerization” Oral session presented at: Solgel 2024, September 1-6th, Berlin, Germany

G. Tayama, S. Santagnelli, Costa, B. H, S. H. Messaddeq, Y. Ledemi, S. Thibault, and Y. Messaddeq “Glass Additive Manufacturing at COPL: Past, Present and Future” **Invited Oral session** presented at: Solgel 2024, May 17-18th, Santa Fe, USA

G. Tayama, S. Santagnelli, S. H. Messaddeq, T. Galstian, and Y. Messaddeq “Compositional dependency of 3D printing parameters in silica-aluminum-phosphate hybrid materials” Oral session presented at: Solgel 2022, July 24-29th, Lyon, France

G. Tayama, S. Santagnelli, M. O. Junior, and Y. Messaddeq “Deep understanding on the formation of silica-aluminum-phosphate hybrid materials using solid-state NMR”. Poster session presented at: Solgel 2022, July 24-29th, Lyon, France

G.Tayama, S. Santagnelli, B. H. Costa, S. Messaddeq, T. Galstian, and Y. Messaddeq “Additive Manufacturing of Glasses by Vat-Photopolymerization of Sol-Gel Precursors” **Invited Oral session** presented at: SYMPOSIUM IRP LUMAQ – Lumière matière Aquitaine Québec, October 11th, Quebec, Canada

G. Tayama, S. Santagnelli, and Y. Messaddeq “Hybrid sol-gel as precursors towards additive manufacturing of photonic”. Poster session presented at: 2nd Photonics National Institute for Science and Technology, February 12-15th, Araraquara, Brazil

G. Tayama, S. Santagnelli, and Y. Messaddeq “Hybrid sol-gel inks for stereolitography of aluminum-phosphate hybrids”. Poster session presented at: 25th International Conference on Glasses 2019, June 9-14th, Boston, USA

G. Tayama, L. S. Gallo, and E. D. Zanotto “Glass-ceramics of high mechanical strength”. Poster session presented at: X BraSGlass – Brazilian Symposium on Glass and Related Materials, October 26-30th, São Carlos, Brazil