Gabriel Murillo Morales

Skype: gabriel.murillom
E-mail: gamurillomorales@pvamu.edu
E-mail: murillom.gabriel@gmail.com
Researchgate profile: https://www.researchgate.net/profile/Gabriel-Murillo-Morales

EDUCATION

2016 - June 2021 Ph.D. Environmental Sciences and Engineering, Jiangsu University
Dissertation: Lignin partial degradation and its valorization in additive manufacturing.

2013 – June 2016 M.S. Renewable Energies, China-European Union Institute of Clean and Renewable Energy, Paris Tech and Huazhong University of Science and Technology.
Research topic: Design and production of a biodiesel reactor with immobilized lipase in NKA resin as biocatalysts.

1999 – April 2004 B.S. Civil Engineering, Latin University of Costa Rica.
Research topic: Geotechnical stability analysis of a slag heap in Pirris hydropower project.

WORK EXPERIENCE

May 2023 – Present Postdoctoral Research Scholar. Center for Energy and Environmental Sustainability (CEES). Prairie View A&M University.

July-Oct 2021 Research Assistant. Biofuels Institute. Jiangsu University.

2010- 2013 Technical Director of Aqueduct Construction Projects in Rural Areas. Executing Unit of Costa Rican Aqueducts Institute-Kreditanstalt für Wiederaufbau Bank (KfW Development Bank).

2007- 2008 Resident Engineer, Geotechnical and Feasibility Studies.
Reventazón Hydropower Project, Costa Rican Electricity Institute.

2007 Engineering Assistant. Environmental Consultant Efrén Murillo Martinez, Costa Rica.

2005- 2006 Resident Engineer, Construction Social Interest Projects (dwelling)
Montelimar Projects and Investments, Costa Rica.

2004 Resident Engineer, Supermarkets Construction
United Supermarkets Corporation, Costa Rica.

PUBLICATIONS

Gabriel Murillo-Morales, Sivasamy Sethupathy, Meng Zhang, Lingxia Xu, Amirreza Ghaznavi, Jie Xu, Bin Yang, Jianzhong Sun, Daochen Zhu. Characterization and 3D printing of a biodegradable polylactic aid/thermoplastic polyurethane blend with laccase-modified lignin as a nucleating agent. International Journal of Biological Macromolecules. Volume 236, 1 May 2023, 123881.

Daochen Zhu, Jianzhong Sun, **Gabriel Murillo Morales,** Chunyan Xu. 2023. Thermoplastic filament containing enzyme-modified lignin and its preparation method and application. Chinese patent ZL202111214435.2, filed: 2021-10-19, issued: 2023-02-17.

Sethupathy, S., **Murillo Morales, G.,** Gao, L., Wang. H., Yang, B., Jiang, J., Sun, J., Zhu, D. 2022. Lignin valorization: status, challenges and opportunities. Bioresource Technology, 126696.

Sethupathy, S., **Murillo, G.,** Li, Y., Wang, Y., Jiang., J., Sun, J., Zhu, D. 2021. Harnessing microbial wealth for lignocellulose biomass valorization: a review. Biotechnology for Biofuels. 14:154.

Murillo, G., Ali, S.S., Si, H., Zhang, W., Zhang, R., Hosseini, K., Sun, J., Zhu, D. 2020. Acidic versus alkaline bacterial degradation of lignin through engineered strain *E.coli* BL21 (Lacc): exploring the differences in chemical structure, morphology, and degradation products. Frontiers in Bioengineering and Biotechnology 8, 868.

Zhu, D., Liang, N., Zhang, R., Ahmad, F., Zhang, W., Yang, B., Wu, J., Geng, A., **Murillo, G.,** Sun, J. 2020. Insight into depolymerization mechanism of bacterial laccase for lignin. ACS Sustainable Chem. Eng. 8, 34, 12920 - 12933.

Murillo, G., Ali, S.S., Sun, J., Yan, Y., Bartocci, P., El-Zawawy, N., Azab, M., He, Y., Fantozzi, F. 2019. Ultrasonic emulsification assisted immobilized *Burkholderia cepacia* lipase catalyzed transesterification of soybean oil for biodiesel production in a novel reactor design. Renewable Energy 135, 1025-1034.

Murillo, G., He, Y., Yan, Y., Sun, J., Bartocci, P., Ali, S.S., Fantozzi, F. 2019. Scaled-up biodiesel synthesis from Chinese Tallow Kernel oil catalyzed by *Burkholderia cepacia* lipase through ultrasonic assisted technology: A nonedible and alternative source of bio energy. Ultrasonics- Sonochemistry 58, 104658.

Murillo, G., Sun, J., Ali, S.S., Yan, Y., Bartocci, P., He, Y. 2018. Evaluation of the kinematic viscosity in biodiesel production with waste vegetable oil, ultrasonic irradiation and enzymatic catalysis: A comparative study in two-reactors. Fuel 233, 573.

Zhu, D., Si, H., Zhang, P., Geng, A., Zhang, W., Yang, B., Qian, W., **Murillo, G.**, Sun, J. 2018. Genomics and biochemistry investigation on the metabolic pathway of milled wood and alkali lignin derived aromatic metabolites of *Comamonas serinivorans* SP-35. Biotechnology for Biofuels 11, 338.

PATENTS

Daochen Zhu, Jianzhong Sun, **Gabriel Murillo Morales**, Chunyan Xu. **Patent No ZL 2021 1 1214435.2**. Method and application of bio-based thermoplastic filament from enzymatically-modified lignin. (Chinese Patent)

AWARDS AND HONORS

2016- 2020 Full Doctoral Scholarship, Chinese Scholarship Council, Jiangsu University
2018 Academic Star Award, Jiangsu University
2013- 2015 Full Master's Scholarship, Chinese Scholarship Council, Huazhong University of Science and Technology
2009 FUNIBER Partial Scholarship, FUNIBER Costa Rica

CONFERENCE PARTICIPATIONS

Oral Presentations

2020 "Lignin Valorization in the Crossroads: A Perspective of its Actual Challenges, and Potential Opportunities," 3rd Sino-Foreign Postgraduate Academic Forum, Jiangsu University, Zhenjiang, China. October 20.

2019 "15-Crown-5, an 'impossible' compound derived from partially biodegraded lignin by *E.coli* BL21 (Lacc) and detected by GC/MS," 2nd International Forum on Synthetic Biology, Nanjing, China. September 25- 27.

2017 "Towards a New Paradigm in Biodiesel Production: Challenges and Future Perspectives," 24th Tri-University International Joint Seminar and Symposium, Mie University, Japan. October 23- 27.

Posters

2019 "Cloning and Expression of a New Bacterial Laccase from *Bacillus ligniniphilus* L1 DSM 26145T in *Escherichia coli* to understand enzymatic lignin depolymerization," 2nd International Forum on Synthetic Biology**,** Nanjing, China. September 25- 27 (as second author).

2018 "The Catalyze Mechanism of Bacterial Source Laccase and Dye Decoloring Enzyme DyP on Lignin and its Derived Aromatic Compounds," 2nd International Symposium on *Zymomonas mobilis*, Hubei University, Wuhan, China. October 20 (as co-author).

2018 "A Proposal for a More Sustainable Management of Agricultural Residues and Food Waste Through Mechanization," 12th Environmental Conference for Doctoral Students, Tsinghua University, Beijing. October 20.

2018 "Towards a New Paradigm for Biodiesel Production: A Proposal from an Energy Policy and Technical Perspectives," 17th International Conference on Sustainable Energy Technologies, Hubei University of Technology, Wuhan, China. August 21- 23(includes conference paper)

TEACHING EXPERIENCE

Jiangsu University

Teaching Assistant, May-June 2021

Responsible for preparing course content, delivering online lectures, and serving as liaison between students and the primary instructor for "Biological Resources and Bioengineering Processes" course for doctoral students in Environmental Science Department.

Teaching Assistant, April-May 2021

Responsibilities included preparing course content, delivering online lectures, and serving as liaison between students and the primary instructor for "Advanced Biotechnology" course for doctoral students in Environmental Science Department.

Instructor, Spring 2018, Fall 2018, Spring 2019

Teaching "MS Excel for Postgraduate Students" to first-year undergraduate students. Responsibilities include planning course content, delivering lectures, and evaluating performance.

Wuhan University Summer Session

Instructor, Summer 2016, Summer 2019 (online), Summer 2020 (online), Winter 2021-22 (online).

Teaching "General Chemistry I" for Chinese national undergraduate students studying in the United States. Responsibilities included planning course content, delivering lectures, and evaluating student performance.

Instructor, Summer 2019 (online), Summer 2020 (online), Winter 2021-2022 (online)

Teaching "General Chemistry II" for Chinese national undergraduate students studying in the United States. Responsibilities included planning course content, delivering lectures, and evaluating student performance.

INTERNSHIPS

Spring 2016 Research Intern, Huazhong University of Science and Technology, School of Life Science. Researched enzymatic biodiesel production with *Burkholderia cepacia* lipase as catalyst with Chinese kernel oil in a 3L batch bioreactor with ultrasonic
assisted technology.

SERVICE AS STUDENT

2019 Member, Society of Agricultural Mechanization of Jiangsu University
2018-2019 Leader of Students, Environmental Science School, Jiangsu University
2018-2019 Vice President of Postgraduate Academic Club, Jiangsu University
2018-2019 Guest Lecturer, "Overcoming Cultural Shock" at HEART Association (Psychology Student Group) of Jiangsu University
2018-2019 Worker's Day Volunteer

RELATED LABORATORY ANALYTICAL EXPERIENCE

Gas chromatograph
HPLC-GPC
GC-MS
Spectrophotometer
FTIR
SEM
TEM
XPS
XRD
^{1}HNMR
Solid ^{13}CNMR
2D (^{1}H-^{13}C) Solid-state NMR
2D (^{1}H-^{13}C) HSQC and HMBC NMR
TLC
TGA
DSC (heating/cooling scans)
Single extruder for thermoplastic filament formation
Rheological analysis
Melt volume rate
Universal machine (for mechanical analysis tests)
Use of additional laboratory equipment: sterilizers, pH-meters, burette, emulsifiers, vacuum driers, freeze driers, ultrasonic baths, ultrasonic probes, stirrers, centrifuges, laminar air flow chamber, N_2, and H_2 cylinders, pyrolysis reactor, biodiesel reactor, electrochemical stations, microscopes, and others.

LANGUAGES

Spanish: Native
English: Advanced; 90 TOEFL score (2015)
Chinese: Intermediate; 190/200 HSK-2 score (2017)
Portuguese: Intermediate
Russian: High Beginner (Reading and Speaking)
French: High Beginner (Reading)

PROFESSIONAL AFFILIATIONS

Federate Professional College of Engineers and Architects of Costa Rica, Member
Civil Engineers Professional College of Costa Rica, Member
Costa Rican Association of Construction Engineers (ACIC), Associate Member
Costa Rican Association of Geotechnics (ACGEO), Associate Member
American Rainwater Catchment Systems Association; ARCSA, Associate Member

REFERENCES

References provided upon request.