Pablo Venegas Garcia

Curriculum Vitae - 2022

Education

2018 - Present **Ph.D. Candidate at Mathematical and Statistical Sciences, Applied Mathematics: Full-Time**, *University of Alberta*, Edmonton, Alberta, Canada.

2017 **M. Sc. Applied and Industrial Mathematics**, *Universidad Autónoma Metrolopolitana-Iztapalapa*, Ciudad de México, México.

2013 **B. Sc. Degree in Physics and Mathematics**, *Universidad Michoacana de San Nicolás de Hidalgo*, Morelia, Michoacán, México.

Research Interests

- Mathematical modelling of soil biodegradation processes as carbon and nitrogen cycles considering stoichiometric frameworks.
- Prediction on methane biogenesis emissions from oil sands tailing ponds and end-pit Lakes.

Current Projects and Research Experience

2018 - Present **Soil biodegradation processes under stoichiometric constraints**, *University of Alberta*, Edmonton, Canada.
Supervisor: Hao Wang.

2018 - Present **Methane biogenesis from fine fluid tailings under different temperatures: Laboratory experiment and mathematical modelling.**, *University of Alberta*, Edmonton, Canada.
Supervisor(s): Hao Wang and Tariq Siddique.

2016-2017 **Macroscopic Models for Two and Three-Phase Traffic Flow (M. Sc. Thesis)**, *Universidad Autónoma Metropolitana-Iztapalapa*, Ciudad de México, México.
Supervisor: Patricia Saavedra Barrera.

2011-2013 **PDE Numerical Solutions Using the Finite Element Method on Irregular Boundaries: UNAMalla and COMSOL-Multiphysics Applications (B. Sc. Thesis)**, *Universidad Michoacana de San Nicolás de Hidalgo*, Morelia, Michoacán, México.
Supervisor(s): Mario César Suárez Arriaga and Francisco Dominguez-Mota.

Publications

2022 Kirkow, V., Wang, H., **Garcia, P. V.**, Ahmed, S., & Heggerud, C. M. Impacts of a changing environment on a stoichiometric producer-grazer system: a stochastic modelling approach. Ecological Modelling, 469, 109971.

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2022 Wang, H., **Garcia, P. V.**, Ahmed, S., & Heggerud, C. M. (2022). Mathematical comparison and empirical review of the Monod and Droop forms for resource-based population dynamics. Ecological Modelling, 466, 109887.

Employment

2018 - Present **Graduate Teaching Asisstant and Graduate Resarch Asistant**, *FGSR, University of Alberta*, Edmonton, Alberta, Canada.

2017 **Lecturer**, *ENES (National School of Higher Education). Universidad Nacional Autónoma de México*, Morelia, Michoacán, México.

2013-2017 **Research Assistant**, *IIES (Ecosystems and Sustainability Research Institute). Universidad Nacional Autónoma de México*, Morelia, Michoacán, México.
Algorithm Developer for Signal Processing. Led Field Campaigns.

Laboratory Instructor

2022 **Ordinary Differential Equations**, *University of Alberta*, Edmonton, Alberta, Canada.
Fall Term.

2022 **Mathematical Biology, Ordinary Differential Equations**, *University of Alberta*, Edmonton, Alberta, Canada.
Winter Term.

2021 **Calculus II**, *University of Alberta*, Edmonton, Alberta, Canada.
Spring, and Fall Terms.

2021 **Mathematical Modeling I, Calculus II**, *University of Alberta*, Edmonton, Alberta, Canada.
Winter Term.

2020 **Calculus II**, *University of Alberta*, Edmonton, Alberta, Canada.
Winter, Spring, and Fall Terms.

2019 **Calculus II**, *University of Alberta*, Edmonton, Alberta, Canada.
Fall Term.

2019 **Mathematical Biology**, *University of Alberta*, Edmonton, Alberta, Canada.
Winter Term.

Teaching Assistant - Grading

2022 **Linear Algebra, Intermediate Calculus IV**, *University of Alberta*, Edmonton, Alberta, Canada.
Summer Term.

2020 **Mathematical Programming and Optimization I**, *University of Alberta*, Edmonton, Alberta, Canada.
Fall Term.

2019 **Graph Theory**, *University of Alberta*, Edmonton, Alberta, Canada.
Summer Term.

2019 **Introduction to Discrete Mathematics**, *University of Alberta*, Edmonton, Alberta, Canada.
Spring Term.

2019 **Elementary Calculus I**, *University of Alberta*, Edmonton, Alberta, Canada.
Winter Term.

2018 **Elementary Calculus I**, *University of Alberta*, Edmonton, Alberta, Canada.
Fall Term.

Courses Taught and Developed

2017 **Mathematical Models in Ecology**, *Universidad Nacional Autónoma de México*, Morelia, Michoacán, México.
Lead Instructor and Curriculum Development. Ecology Undergraduate Program.

2011-2012 **Ordinary Differential Equations**, *Universidad Michoacana de San Nicolás de Hidalgo*, Morelia, Michoacán, México.
Instructor Assistant and Curriculum Development. Civil Engineering Undergraduate Program.

Patents

2016 Ruiz-Mercado I, **Venegas García P**, Guzmán Gómez SL. (2016). SoftSUMit Software. UNAM 03-2016-05271215-1700-01.

Past Project Experience

2015 Ruiz-Mercado, I., Eav, J., **Venegas, P.**, Vaswani, M., Allen, T., Charron, D., & Smith, K. R. Wireless Stove Use Monitors (wSUMs) for Remotely Measuring Cookstove Usage.

Field Campaigns

2018 **Adoption Processes of Biodigesters and Biogas Stoves in the Yucatan Peninsula: Field Monitoring of Usage Patterns and Impacts**, *Collaborative project with the NGO International Renewable Resources Institute and the company Biobolsa*
Field deployment of electronic monitors on remote rural homes in the Mayan Jungle and algorithm development for signal analysis.

2015-2016 **Integral Evaluation of Efficient Cookstoves in San Luis Potosí and Intervention Design**, *Ecotechnology Adoption and Monitoring Laboratory. Dr. Ilse Ruiz-Mercado, UNAM*, Morelia, Michoacán, México
Field deployment of electronic monitors on remote rural homes in the Huasteca Potosina (San Luis Potosí México) and in-field algorithm development for signal analysis.

2013-2014 **Wireless Stove Use Monitors (wSUMs)**, *UNAM-UC Berkeley Project*, Morelia, Michoacán, México
Laboratory testing of sensor perfomance and field validation of fuel and stove usage metrics in rural Purépecha homes in Michoacán México.

Conference and Seminars Presentations

2016 **XLIX National Conference of the Mexican Mathematical Society.** *"Traffic Flow Modelling including In/Out Ramps and other variants".* Aguascalientes, México.

2014 **XXIV National School of Optimization and Numeric Analisis.** *"Use and Monitoring of Ecotechnologies in Rural Communities: A Numerical Approach".* Guanajuato, Gto. México.

2012 **Scientific Computing Laboratory Seminar.** *"PDE Numerical Solutions on Irregular Domains Using the Finite Element Method and UNAMalla".* UNAM, Ciudad de México, México.

2012 **XX Annual AGM Conference and I Latin American Geothermic Conference.** *"Finite Element Method Potential for Modelling Advanced Geothermic Systems".* Morelia, Mich. México.

2012 **XLV National Conference of the Mexican Mathematical Society.** *"Numerical Solutions of the Wave Equation on Irregular Domains Using Finite Element Method".* Querétaro. Qro. México.

2010 **Shenyang University of Technology Seminar.** *"Quaternion Algebra: Vector Rotation in $\mathbb{R}^3$, Applications in Object Positioning and Space Aircrafts".* Shenyang, China.

2010 **X International Mathematica Symposium.** *"Use of the Finite Element Method in Mathematica". With PhD. Mario César Suárez Arriaga.* Universidad de Tsinghua. Beijing, China.

2009 **XLII National Conference of the Mexican Mathematical Society.** *"Quaternion Algebra: Vector Rotation in $\mathbb{R}^3$".* Zacatecas, Zac. México.

Additional Information

Language: Spanish (Native Language), English (TOEFL iBT).

Programming Langauages: XPP/AUTO, MATLAB, Phyton, R, COMSOL, Mathematica.