

CURRICULUM VITAE

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Current affiliation

Postdoctoral Researcher, NORCE Norwegian Research Centre AS, Norway, Aug 2019 –.

Previous work experience

Teaching assistant in Introduction to Computing and Quantum Information, UNAM, Mexico, 2014.

Teaching assistant in Analytical Mechanics, UNAM, Mexico, 2013.

Teaching assistant in Electromagnetism, UNAM, Mexico, 2013.

Teaching assistant in Computational Physics, UNAM, Mexico, 2012.

Education

Ph.D. in **Applied Mathematics**, University of Bergen, Norway, June 2019.

Supervisors: Prof. Dr. Florin Radu, Prof. Dr. Sorin Pop, and Prof. Dr. Kundan Kumar.

Thesis title: Mathematical Modeling of Microbial Enhanced Oil Recovery with Focus on Bio-Plug Technology: From the Pore to the Core Scale.

M.Sc. in **Applied Mathematics**, University of Bergen, Norway, 2016.

Supervisors: Prof. Dr. Florin Radu and Prof. Dr. Jan Nordbotten.

Thesis title: Modeling and Simulation of Microbial Enhanced Oil Recovery: A New Approach which Includes the Role of Interfacial Area.

B. in **Mathematics**, National Autonomous University of Mexico (UNAM), Mexico, 2015.

Supervisor: Prof Dr. Jorge Fujioka Rojas.

Thesis title: Un Teorema de Noether Fraccionario (A Fractional Noether's Theorem).

B. in **Physics**, National Autonomous University of Mexico (UNAM), Mexico, 2013.

Digital System Technician, Instituto Politécnico Nacional (IPN), Mexico, 2009.

Awards

Best poster presentation at SIAM Conference on Mathematical and Computational Issues in the Geosciences at Friedrich-Alexander University Erlangen-Nürnberg, Germany, 2017.

Medal Gabino Barreda (best student in Physics, generational award), UNAM, Mexico, 2016.

Mención Honorífica (graduated with honors), UNAM, Mexico, 2015.

Bronze Medal, XIV Iberoamerican Physics Olympiad, Chile, 2009.

First Place, Physics Academic Meeting "Interpolitécnico", IPN, Mexico, 2009.

Gold Medal, XIX National Physics Olympiad, Sociedad Mexicana de Física, Mexico, 2008.

Funding record

Meltzer project grant, mobility funds for travel, 14,982 NOK, 2019.

BFS project “Pure mathematics in Norway”, mobility funds for travel, 24,808 NOK, 2018.

Meltzer project grant, mobility funds for travel; 15,750 NOK, 2018

Academia agreement, mobility funds for travel; 13,500 NOK, 2018

Academia agreement, mobility funds for travel; 10,918 NOK, 2016.

Conferences

Talk at CMWR, California, USA, 2020.

Talk at InterPore, Tsingtao, China, 2020.

Poster presentation at InterPore, Valencia, Spain, 2019.

Talk at SIAM Conference on Mathematical and Computational Issues in the Geosciences, Texas, USA, 2019.

Poster presentation at the National Meeting of Mathematicians, Bergen, Norway, 2018.

Poster presentation at the International Congress of Mathematicians, Río de Janeiro, Brazil, 2018.

Poster presentation at the Annual Meeting of the Society for Mathematical Biology and the Japanese Society for Mathematical Biology, Sydney, Australia, 2018.

Talk at European Conference on Numerical Mathematics and Advanced Applications, Voss, Norway, 2017.

Poster presentation at SIAM Conference on Mathematical and Computational Issues in the Geosciences, Erlangen-Nürnberg, Germany, 2017.

Poster presentation at 19th European Symposium on Improved Oil Recovery, Stavanger, Norway, 2017.

Workshops

2nd Workshop on computational aspects of perfusion and flow in live tissue, at University of Bergen, Norway, 2017.

Qualitative and numerical aspects of mathematical modelling at Western Norway University of Applied Sciences, Norway, 2017.

Modeling and Benchmarking of fractured porous media: flow, transport and deformation at University of Bergen, Norway, 2017.

Schools/Visits

Summer school on simulation software development using DUNE, DuMuX, OPM and PorePy at the Dr. Holms Hotel (Geilo), Norway, 2019.

Summer school on phase field modeling at University of Hasselt, Belgium, 2019.

Summer school on upscaling techniques for mathematical models involving multiple scales at University, of Hasselt, Belgium, 2017.

Student tour, Non-linearities and Upscaling in PoroUS Media (NUPUS), Italy and Germany, 2017.

Student tour, Non-linearities and Upscaling in PoroUS Media (NUPUS), USA, 2015.

IV School in Physics of Nanostructures at Center for Nanoscience and Nanotechnology (Ensenada), Mexico, 2013.

XXI Summer school in Physics at Institute of Physics (UNAM), Mexico, 2013.

Advanced Summer school in Physics, CINVESTAV-IPN, Mexico, 2012.

XX Summer school in Physics at Institute of Physics (UNAM), Mexico, 2012.

Advising

Co-advised one master student.

Professional service

Active reviewer of international journals (AIChE Journal, Computational Geosciences, International Journal of Greenhouse Gas Control). I have also reviewed papers in: proceedings of Finite Volumes for Complex Applications IX, proceedings of Numerical Mathematics and Advanced Applications ENUMATH 2017.

Research interests

Flow in porous media: multi-phase, non-standard models, reactive transport.

Mathematical modeling: microbial enhanced oil recovery (MEOR), microbially induced calcite precipitation (MICP), carbon capture and storage (CCS).

Model inputs and outputs: parameter calibration, sensitivity analysis, optimization techniques.

Numerical methods: discretization (FEM/FV), linearization schemes.

Upscaling: homogenization, asymptotic expansions.

Languages

Spanish (Mother tongue), English (Fluent), Norwegian (B1), French (A2).

Programming languages

High level: MATLAB, R, C++ Medium level: Fortran, Python.

Publications

No. of publications: In journals: 6, submitted: 1, Book chapters/proceedings: 4.

Submitted

- [1] Landa-Marbán, D., Tveit, S., Kumar, K., Gasda, S.E. Practical approaches to study microbially induced calcite precipitation at the field scale. **Submitted to International Journal of Greenhouse Gas Control.**

Journal articles

- [2] Landa-Marbán, D., Bødtker, G., Vik, B.F., Pettersson, P., Pop, I.S., Kumar, K., Radu, F.A. 2020. Mathematical modeling, laboratory experiments, and sensitivity analysis of bioplug technology at Darcy scale. *SPE J.* **25** (6), 3120–3137. <https://doi.org/10.2118/201247-PA>.
- [3] Landa-Marbán, D., Bødtker, G., Kumar, K., Pop, I.S., Radu, F.A. 2020. An upscaled model for permeable biofilm in a thin channel and tube. *Transp. Porous Med.* **132**, 83–112. <https://doi.org/10.1007/s11242-020-01381-5>.
- [4] Landa-Marbán, D., Liu, N., Pop, I.S., Kumar, K., Pettersson, P., Bødtker, G., Skauge, T., Radu, F.A. 2019. A pore-scale model for permeable biofilm: Numerical simulations and laboratory experiments. *Transp. Porous Med.* **127** (3), 643–660. <https://doi.org/10.1007/s11242-018-1218-8>.
- [5] Liu, N., Skauge, T., Landa-Marbán, D., Hovland, B., Thorbjørnsen, B., Radu, F.A., Vik, B.F., Baumann, T., Bødtker, G. 2019. Microfluidic study of effects of flow velocity and nutrient concentration on biofilm accumulation and adhesive strength in the flowing and no-flowing microchannels. *J. Ind. Microbiol. Biotechnol.* **46**, 855–868. <https://doi.org/10.1007/s10295-019-02161-x>.
- [6] Landa-Marbán, D., Radu, F.A., Nordbotten, J.M. 2017. Modeling and simulation of microbial enhanced oil recovery including interfacial area. *Transp. Porous Med.* **120** (2), 395–413. <https://doi.org/10.1007/s11242-017-0929-6>.

- [7] Landa-Marbán, D., Bietenholz, W., Hip, I. 2014. Features of a 2d gauge theory with vanishing chiral condensate. *Int. J. Mod. Phys. C* **25** (10), 1450051. <https://doi.org/10.1142/S012918311450051X>.

Book chapters and conference proceeding

- [8] Tveit, S., Pettersson, P., Landa-Marbán, D. 2020. Optimizing sealing of CO₂ leakage paths with microbially induced calcite precipitation under uncertainty. **ECMOR XVII 17th European Conference on the Mathematics of Oil Recovery 2020**, 1–12. <https://doi.org/10.3997/2214-4609.202035087>.
- [9] Landa-Marbán, D., Pop, I.S., Kumar, K., Radu, F.A. 2019. Numerical simulation of biofilm formation in a microchannel. In *Numerical Mathematics and Advanced Applications ENUMATH 2017* (ed. Radu, F.A., Kumar, K., Berre, I., Nordbotten, J.M. & Pop, I.S.), **126**, 799–807, Springer International Publishing, Cham. https://doi.org/10.1007/978-3-319-96415-7_75.
- [10] Landa-Marbán, D., Radu, F.A., Nordbotten, J.M. 2017. A non-standard model for microbial enhanced oil recovery including the oil-water interfacial area. **IOR 2017 - 19th European Symposium on Improved Oil Recovery 2017**, 1–10. <https://doi.org/10.3997/2214-4609.201700254>.
- [11] Bietenholz, W., Hip, I., Landa-Marbán, D. 2014. Spectral properties of a 2d IR conformal theory *PoS LATTICE 2013*, 486. <https://doi.org/10.22323/1.187.0486>.