

# Isidro Gómez Vargas

PhD candidate

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## Education

- 2017– today **PhD student**, *Advanced Technology*, CICATA-Legaria, IPN, México city (from 2019 to 2020 associate student in ICF-UNAM), Thesis: *Bayesian inference and function reconstruction with artificial neural networks*.  
Supervisors: PhD. Ricardo García Salcedo and PhD. José Alberto Vázquez González.
- 2015 **Master**, *Advanced Technology*, CICATA-Legaria, IPN, Thesis: *Design and development of an Augmented Reality mobile app for the teaching of geometry*.  
Supervisors: PhD. Ricardo García Salcedo and PhD. Daniel Sánchez Guzmán.
- 2013 **Bachelor**, *Physics and mathematics*, ESFM-IPN, México city, Thesis: *Operational Tracking of a Fuel Recharge of a BWR with SIMULATE-3*.  
Supervisor: PhD. Edmundo del Valle Gallegos.

## Research Stays

- 2020 **Reversible nested sampling**, *Remote collaboration due to the COVID-19 pandemic*, Cambridge University, UK.  
Supervisor: Dr. Will Handley
- 2019 **Parameter estimation in observational cosmology with SimpleMC**, *ICF-UNAM*, Cuernavaca, Morelos, México.  
Supervisor: PhD. José Alberto Vázquez González.
- 2018 **Estimation of cosmological parameters with CosmoSIS codes**, *IFM*, UMSNH, Morelia, Michoacán, México.  
Supervisor: PhD. Ulises Nucamendi Gómez.
- 2016 **Intelligent Tutors Agents for the Improvement of Cognitive and Behavioural Processes of University Students, in Support of the Increase in the Student Approval and Retention Index**, *Department of Information and Visualization Technologies of UABC-Ensenada*, Ensenada, Baja California, México.  
Supervisors: PhD. Omar Alvarez Xochihua and MSc. Sergio O. Infante Prieto.

## Courses, workshops and certifications

- 2020 **School of modeling and numerical methods. Supercomputing**, *CIMAT*, Guanajuato, México.
- 2020 **Evolutionary computing**, *online non-credit course authorized by UNAM and offered through Coursera*, 20 hours.
- 2019 **Data-driven Astronomy**, *online non-credit course authorized by The University of Sydney and offered through Coursera*, 30 hours.
- 2017 **Diplomat**, *Knowledge Discovery with Big Data tools*, *CIC*, IPN, México city, 124 hours.
- 2017 **Python programming with applications in the scientific field**, *CIC*, IPN, México city, 35 hours.
- 2016 **Basic Java**, *CIC*, IPN, México city, 35 hours.

## Publications

### Papers and proceedings as first author

- 2021 Gómez-Vargas, I., Medel-Esquivel, R., García-Salcedo, R. & Vázquez J. A., **Neural networks within a Bayesian inference framework**, *Accepted in Journal of Physics: Conference Series*. IOP Publishing .
- 2019 Gómez Vargas, I., Medel Esquivel, R., García Salcedo, R. & J. A. Vázquez, **Una Aplicación de las Redes Neuronales en Cosmología**, *Komputer Sapiens*, 2(11), 12-17.

2019 Gómez-Vargas, I., Medel-Esquivel, R., & García-Salcedo, R., **Cosmic voids, spatial algorithms and data structures.**, In Journal of Physics: Conference Series (Vol. 1221, No. 1, p. 012031). IOP Publishing.

2018 Gómez Vargas, I., Medel Esquivel, R. & García Salcedo, R., **Realidad Aumentada como herramienta didáctica en geometría 3D**, Latin-American Journal of Physics Education., 12(4), 3.

#### Papers and proceedings as collaborator

2021 Medel-Esquivel, R., Gómez-Vargas, I., Rivera-Montalvo, T., Vázquez J. A. & García-Salcedo, R., **The inverse problem of a dynamical system solved with genetic algorithms**, *Accepted in* Journal of Physics: Conference Series. IOP Publishing.

2021 Toledo Elizalde, M. R; Vázquez Cerón, ER; García-Salcedo, R; Gómez-Vargas, I; Uruchurtu Chavarín, ES & Rivera-Montalvo, **Data Mining applied to interventional cardiology proceduress**, *Accepted in* Journal of Physics: Conference Series. IOP Publishing.

2021 Medel Esquivel, R., Gómez Vargas, I., Vázquez, JA., & García Salcedo, R., **A simple estimation of the size of the molecules using a pencil lead**, *Accepted in* The Physics Teacher journal, arXiv preprint arXiv:2001.03492.

2021 Medel Esquivel, R., Gómez Vargas, I., Vázquez, JA., & García Salcedo, R., **An introduction to Markov Chain Monte Carlo**, Boletín de Estadística e Investigación Operativa, *Accepted in* No. 37 year 2021.

2019 Medel-Esquivel, R., Gómez-Vargas, I., Rivera-Moltalvo, T., & Salcedo, R. G., **Cosmological evolution for magnetic universe based in a simple nonlinear electrodynamics.**, In Journal of Physics: Conference Series (Vol. 1221, No. 1, p. 012038). IOP Publishing.

#### Books or chapters

2019 Medel Esquivel, García Salcedo, R. & Gómez Vargas, I., **Textbook Matemáticas III Travesías**, Ed. Castillo., ISBN: 978-607-540-522-3.

2017 Gómez Vargas, Isidro, **Didactic possibility of Augmented Reality**, Sólo ensayo. Antología de Jóvenes escritores Vol. 2. IPN. ISBN: 978-607- 8085-13-2.

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### Work Experience

2016-2018 **Author, collaborator and technical reviewer**, Castillo editions, SM editorial, Edimend, Quipper and Khan academy, Textbooks of physics and mathematics, high school level.

2013-2014 **Teacher**, CECyT 8, IPN, Professor on high school of mathematics and physics.

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### Awards and grants

2015- 2020 **CONACYT grant**, quality Mexican postgraduate programs.

2017-2020 **BEIFI-IPN grant**, *proyects 20190237, 2018252, 20172234, 20170322*, Data mining and statistical algorithms applied in physics.

2018 **Technological Development or Innovation Projects for IPN students 2018**, SIP-IPN, \$2,500.00 USD.

2017 **2nd place**, XIX International Christmas, Sudden, Brief and Electronic Story Contest, Ficticia editorial.

2016 **2nd place**, Educational Innovation Essay Award, graduate category, essay "Augmented Reality for an education". IPN, \$500.00 USD.

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### Workshops and conferences given

2020 **Statistical methods with neural networks in observational cosmology**, V Meeting of Mathematical Modeling in Physics and Geometry, Mesoamerican Center of Theoretical Physics.

2020 **Neural networks applied to statistical methods of observational cosmology**, CosmoS: cosmology student group seminar, México.

2020 **Workshop: Cosmology with SimpleMC 2.0**, from June 3rd to 5th. Theoretical and computational physics group, ICF, UNAM, Cuernavaca, México.

2019 **Nested sampling, neural networks and SimpleMC**, seminar of gravitation and cosmology, ICF, UNAM, Cuernavaca, México.

2019 **Neural networks in cosmological parameter estimation**, 3a. Mexican AstroCosmoStatistics School, Physics department, Guanajuato University.

- 2018 **Data science algorithms for cosmic voids**, *National School of Cosmology*, Engineering Division, Universidad de Guanajuato.
- 2017 **Augmented Reality as a didactic tool in 3D geometry**, *LASERA conference 2017*, Latin American Association of Research in Science Education.

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## Poster presentations

- 2019 **Artificial Neural Networks as optimizers in Bayesian inference**, *Joint workshop on Deep Learning and Data Science*, CIMAT-INAOE, CIMAT, Guanajuato, Mexico.
- 2019 **State of the art in the application of Artificial Neural Networks in diagnostic radiology**, *XIX International Symposium on Solid State Dosimetry*, Zacatecas, México.

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## Skills

Programming: Python, SQL. Intermediate: R, C, C#, Java

OS: Windows, Linux.

Languages: native Spanish, intermediate English.

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## Contact links

ResearchGate: [www.researchgate.net/profile/Isidro\\_Gomez-Vargas2](http://www.researchgate.net/profile/Isidro_Gomez-Vargas2)

LinkedIn: [www.linkedin.com/in/isidro-gomez-vargas/](http://www.linkedin.com/in/isidro-gomez-vargas/)

GitHub <https://github.com/igomezv/>

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## References

Dr. Ricardo García Salcedo: [rigarcias@ipn.mx](mailto:rigarcias@ipn.mx)

Dr. José Alberto Vázquez González: [javazquez@icf.unam.mx](mailto:javazquez@icf.unam.mx)