Bernardo Pulido Gaytan

Curriculum Vitae

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Personal information

Full name	Luis Bernardo Pulido Gaytan
Birth	December 8th 1992, Tamaulipas, México
Gender	Male
Nationality	Mexican

Academic education

2020–2024 **Ph.D. in Computer Science**, Department of Computer Science, CICESE Research Center, Ensenada, Baja California, México

Thesis: *"Self-learning activation functions for privacy-preserving convolutional neural networks with homomorphic encryption"*

Thesis Advisor: Dr. Andrey Chernykh

2017–2019 **M.Sc. in Computer Science**, Department of Computer Science, CICESE Research Center, Ensenada, Baja California, México

Academic ranking: 96.33/100

Thesis: *"Multi-Objective Optimization of Vehicle Routing with Environmental Penalty in Smart Cities"*

Thesis Advisor: Dr. Andrey Chernykh

2012–2017 **Bachelor in Computer Science**, Instituto Politécnico Nacional (IPN)

Academic ranking: 95/100

Thesis: *"Development of a mobile application for personal security by voice recognition"*

Academic appointments

July 2024–present **Postdoctoral Research Associate**, Cloud Competency Centre, National College of Ireland, Dublin, Ireland

Manager: Dr. Horacio Gonzalez-Velez

Publications

Journal papers

B. Pulido-Gaytan, A. Tchernykh. Self-Learning Activation Functions to Increase Accuracy of Privacy-Preserving Convolutional Neural Networks with Homomorphic Encryption. PLoS ONE 19(7): e0306420 (2024). https://doi.org/10.1371/journal.pone.0306420

B. Pulido-Gaytan, A. Tchernykh, F. Leprévost, P. Bouvry, A. Goldman. Towards Understanding Efficient Privacy-Preserving Homomorphic Comparison. IEEE Access. 11, 102189-102206 (2023). https://doi.org/10.1109/ACCESS.2023.3315655

M. Babenko, E. Golimblevskaia, A. Tchernykh, E. Shiriaev, T. Ermakova, **B. Pulido-Gaytan**, G. Valuev, A. Avetisyan, L. Gagloeva. A Comparative Study of Secure Outsourced Matrix Multiplication Based on Homomorphic Encryption. Big Data Cogn. Comput. 7(2), 84 (2023). https://doi.org/10.3390/bdcc7020084

E. Bezuglova, E. Shiriaev, M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**, J.M. Cortes-Mendoza. A survey on multi-cloud storage security: threats and countermeasures. Computational Technologies. 28(1), 72-80 (2023). https://doi.org/10.25743/ICT.2023.28.1.008

M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**, A. Avetisyan, S. Nesmachnow, X. Wang, F. Granelli. Towards the sign function best approximation for secure outsourced computations and control. Mathematics. 10(12), 2006 (2022). https://doi.org/10.3390/math10122006

RM. Canosa-Reyes, A. Tchernykh, JM. Cortes-Mendoza, **B. Pulido-Gaytan**, R. Rivera-Rodriguez, JE. Lozano-Rizk, et al. Dynamic performance-Energy tradeoff consolidation with contention-aware resource provisioning in containerized clouds. PLoS ONE 17(1), e0261856 (2022). https://doi.org/10.1371/journal.pone.0261856

A. Tchernykh, M. Babenko, E. Shiriaev, **B. Pulido-Gaytan**, JM. Cortes-Mendoza, A. Avetisyan, AY. Drozdov, V. Kuchukov. An Efficient Method for Comparing Numbers and Determining the Sign of a Number in RNS for Even Ranges. Computation 10(2), 17 (2022). https://doi.org/10.3390/computation10020017

B. Pulido-Gaytan, A. Tchernykh, J. M. Cortes-Mendoza, M. Babenko, G. Radchenko, A. Avetisyan, A. Yu. Drozdov. Privacy-preserving neural networks with Homomorphic encryption: Challenges and opportunities. Peer-to-Peer Netw. Appl. 14, 1666 (2021). https://doi.org/10.1007/s12083-021-01076-8

N. Vershkov, M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**, J. M. Cortes-Mendoza, V. Kuchukova, N. Kuchukov. Optimization of Neural Network Training for Image Recognition Based on Trigonometric Polynomial Approximation. Program Comput Soft 47, 830–838 (2021). https://doi.org/10.1134/S0361768821080272

M. Babenko, A. Nazarova, A. Tchernykh, **B. Pulido-Gaytan**, J. M. Cortes-Mendoza, I. Vashchenko. Algorithm for Constructing Modular Projections for Correcting Multiple Errors Based on a Redundant Residue Number System Using Maximum Likelihood Decoding. Program Comput Soft 47, 839–848 (2021). https://doi.org/10.1134/S0361768821080089

Conference papers

M. A. Ojewale, A. E. Chis, J. M. Cortes-Mendoza, **B. Pulido-Gaytan**, H. Gonzalez-Velez. FlashbackCL: Mitigating Temporal Forgetting in Federated Learning. 35th International Joint Conference on Artificial Intelligence (IJCAI 2026), 15-21 August, 2026, Bremen, Germany (CORE Rank A^*) (Accepted).

B. Pulido-Gaytan, A. Tchernykh, H. González-Vélez. Cryptographically Computable Self-Learning Activation Functions for Privacy-Preserving Logistic Regression with Homomorphic Encryption. 40th IEEE International Parallel & Distributed Processing Symposium (IPDPS), New Orleans, LA, USA, 2026, pp. 571-579, doi: 10.1109/IPDPSW71298.2026.00096 (CORE Rank A)

A. G. Calzada-Jasso, A. Tchernykh, I. D. Avendano-Pacheco, J. M. Cortes-Mendoza, **B. Pulido-Gaytan**, M. Babenko, A. Goldman, H. González-Vélez. Generative Fabrication of Medical Images for Machine Learning Training. 37th IEEE/SBC International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD), Bonito, MS, Brazil, 2025, pp. 136-145, doi: 10.1109/SBAC-PAD66369.2025.00022 (CORE Rank B).

A. Tchernykh, M. Salgado-Ramos, **B. Pulido-Gaytan**, H. González-Vélez, E. Mocskos, M. Babenko. Efficient Privacy-Preserving Convolutional Neural Networks with CKKS-RNS for Encrypted Image Classification. 39th IEEE International Parallel and Distributed Processing Symposium (IPDPS), Milano, Italy, 2025, pp. 343-352, doi: 10.1109/IPDPSW66978.2025.00059 (CORE Rank A)

B. Pulido-Gaytan, A. Tchernykh, M. Babenko, J. M. Cortes-Mendoza, H. González-Vélez, A. Avetisyan. Enhancing Cloud Security through Efficient Polynomial Approximations for Homomorphic Evaluation of Neural Network Activation Functions. 2024 IEEE 24th International Symposium on Cluster, Cloud and Internet Computing Workshops (CCGridW), Philadelphia, PA, USA, 2024, pp. 42-49, doi: 10.1109/CCGridW63211.2024.00011 (CORE Rank A)

E. Shiryaev, E. Bezuglova, M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**, J. M. Cortes-Mendoza. Performance Impact of Error Correction Codes in RNS with Returning Methods and Base Extension. 2021 International Conference Engineering and Telecommunication, 2021, pp. 1-5, doi: 10.1109/EnT50460.2021.9681756

J. M. Cortes-Mendoza, A. Tchernykh, M. Babenko, **B. Pulido-Gaytan**, G. Radchenko. Multi-cloud Privacy-Preserving Logistic Regression. In: Voevodin V., Sobolev S. (eds) Supercomputing. RuSCDays 2021. vol 1510. pp 457-471, Springer, doi: 10.1007/978-3-030-92864-3_35

A. Tchernykh, N. Babenko, **B. Pulido-Gaytan**, E. Shiryaev, E. Golimblevskaia, A. Avetisyan, N. Viet Hung, JM. Cortes-Mendoza. Cryptographic Primitives Optimization Based on the Concepts of the Residue Number System and Finite Ring Neural Network. In: Dorronsoro B., Amodeo L., Pavone M., Ruiz P. (eds) Optimization and Learning. OLA 2021. Communications in Computer and Information Science, vol 1443. pp. 241-253, Springer, 2021, doi: 10.1007/978-3-030-85672-4_18

M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**, JM. Cortes-Mendoza, E. Shiryaev, E. Golimblevskaia, A. Avetisyan, S. Nesmachnow. RRNS Base Extension Error-Correcting Code for Performance Optimization of Scalable Reliable Distributed Cloud Data Storage. IPDPSW 2021 - IEEE International Parallel and Distributed Processing Symposium Workshops, 548-553, 2021, doi: 10.1109/IPDPSW52791.2021.00087 (CORE Rank A)

JM. Cortes-Mendoza, G. Radchenko, A. Tchernykh, **B. Pulido-Gaytan**, M. Babenko, A. Avetisyan, P. Bouvry, A. Zomaya. LR-GD-RNS: Enhanced Privacy-Preserving Logistic Regression Algorithms for Secure Deployment in Untrusted Environments. CCGRID 2021-The 21th IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing, 2021, pp. 770-775, Melbourne, Victoria, Australia, doi: 10.1109/CCGrid51090.2021.00093 (CORE Rank A)

A. Tchernykh, A. Facio Medina, **B. Pulido-Gaytan**, JM. Cortes-Mendoza, G. Radchenko, M. Babenko, I. Chernykh, I. Kulikov, S. Nesmachnow, R. Rivera-Rodriguez. Toward digital twins' workload allocation on clouds with low-cost microservices streaming interaction. ISPRAS OPEN 2020 - Ivannikov ISP RAS Open Conference, Moscow, Russia, December 10-11, 2020 pp. 115-124, doi: 10.1109/ISPRAS51486.2020.00024

M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**, E. Golimblevskaia, J. M. Cortes-Mendoza, A. Avetisyan. Experimental Evaluation of Homomorphic Comparison Methods, 2020 Ivannikov Ispras Open Conference (ISPRAS), 2020, pp. 69-74, doi: 10.1109/ISPRAS51486.2020.00017

M. Babenko, A. Tchernykh, E. Golimblevskaia, **B. Pulido-Gaytan**, A. Avetisyan. Homomorphic Comparison Methods: Technologies, Challenges, and Opportunities. En&T-2020 - 2020 International Conference Engineering and Telecommunication, IEEE, 2021, pp. 1-5, doi: 10.1109/EnT50437.2020.9431252

E. Shiryaev, E. Golimblevskaia, M. Babenko, A. Tchernykh, **B. Pulido-Gaytan**. Improvement of the approximate method for the comparison operation in the RNS. En&T-2020 - 2020 International Conference Engineering and Telecommunication (En&T), IEEE, 2021, pp. 1-6, doi: 10.1109/EnT50437.2020.9431290

J. M. Cortes-Mendoza, A. Tchernykh, M. Babenko, **B. Pulido-Gaytan**, G. Radchenko, F. Leprevost, X. Wang. Privacy-Preserving Logistic Regression as a Cloud Service based on Residue Number System. In Supercomputing. RuSCDays 2020. vol 1331, doi: 10.1007/978-3-030-64616-5_51

B. Pulido-Gaytan, A. Tchernykh, JM. Cortes-Mendoza, M. Babenko, G. Radchenko. A Survey on Privacy-Preserving Machine Learning with Fully Homomorphic Encryption. In: In: Nesmachnow S., Castro H., Tchernykh A. (eds) High Performance Computing. CARLA 2020. vol 1327. pp 115-129 2021, Springer, doi: 10.1007/978-3-030-68035-0_9

B. Pulido-Gaytan, A. Tchernykh, S. Nesmachnow, A. Salas, A. Avetisyan, H. E. Castro, C. J. Barrios. Multi-Objective Optimization of Vehicle Routing with Environmental Penalty. In: Torres M., Klapp J. (eds) Supercomputing. ISUM 2019. Communications in Computer and Information Science, vol 1151, pp 147-162, 2019, Springer, doi: 10.1007/978-3-030-38043-4_13

B. Pulido-Gaytan, A. Tchernykh, M. Babenko, J. M. Cortes-Mendoza, G. Radchenko, A. Avetisyan, A. Yu. Drozdov. Toward Fast and Accurate Polynomial Approximations for Practical Homomorphic Evaluation of Neural Network Activation Functions. HPCS 2020 - The 18th International Conference on High Performance Computing & Simulation. October 26-30, 2020, Barcelona, Spain (CORE Rank B) (Accepted)

Invited talks

Sustainability Day, National College of Ireland. Dublin, Ireland, December 3, 2025. SMARCO - SMARt COmmunities Skills Development in Europe

CICESE Research Center. Ensenada, Baja California, Mexico, September 20, 2024. Academic collaboration: Challenges and Opportunities

National College of Ireland. Dublin, Ireland, January 24, 2024. Privacy-Preserving Neural Networks with Homomorphic Encryption in Cloud Computing

CICESE Research Center. Ensenada, Baja California, Mexico, August 4, 2023. Preserving Privacy in Neural Network Processing with Homomorphic Encryption

INAOE Research Center. Puebla, Mexico, March 9, 2023. Toward Efficient Privacy-Preserving Neural Networks with Homomorphic Encryption

54th National Congress of the Mexican Mathematical Society (SMM 2021). Mexico, October 20, 2021. Toward Efficient Privacy-Preserving Neural Networks with Homomorphic Encryption

National Supercomputing Forum (NSCF-2021). Program Systems Institute of the RAS. Russia, Pereslavl-Zalessky, November 30, 2021. Toward Efficient Privacy-Preserving Neural Networks with Homomorphic Encryption

CETYS University. Ensenada, Baja California, Mexico, August 23, 2021. Privacy-Preserving Machine Learning

Media Coverage

March 2025 **Pulido-Gaytan, B. Featured in Silicon Republic:** "This researcher is developing data-privacy tools for the quantum age".

Research internships

Jan 2024 **National College of Ireland, Dublin, Ireland (European Cooperation in Science and Technology Grant)**, *Privacy-Preserving Neural Networks with Homomorphic Encryption in Cloud Computing*, Supervisor: Dr. Horacio González-Vélez

Dec 2023–Feb 2024 **University of Göttingen and GWDG of Max Planck Society, Göttingen, Germany (DAAD Grant)**, *Privacy-Preserving Neural Networks with Homomorphic Encryption in Cloud Computing*, Supervisor: Dr. Ramin Yahyapour

Oct 2021–Jan 2022 **North-Caucasus Center for Mathematical Research, North-Caucasus Federal University, Stavropol, Russia**, *Privacy-Preserving Neural Networks with Homomorphic Encryption*, Supervisor: Dr. Mikhail Babenko

Jan–Mar 2019 **Faculty of Engineering. Universidad de la República. Montevideo, Uruguay**, *Urban transportation planning in smart cities*, Supervisor: Dr. Sergio Nesmachnow

Sep 2019 **National High Technology Center, San José, Costa Rica**, *Foundations of Urban Informatics: Mobility Data Analysis*

Teaching experience

2026 **Research in Computing**, *Postgraduate course*, National College of Ireland, MSc in Cloud Computing (Module leader)

2026 **Scalable Cloud Programming**, *Postgraduate course*, National College of Ireland, MSc in Cloud Computing (Module leader)

2025 **Enterprise Architecture, Infrastructure Design and Cloud Computing**, *Postgraduate course*, University Politehnica of Bucharest, Digital4Security Master's Programme

2025 **Research in Computing**, *Postgraduate course*, National College of Ireland, MSc in Cloud Computing (Module leader)

2025 **Scalable Cloud Programming**, *Postgraduate course*, National College of Ireland, MSc in Cloud Computing (Module leader)

Editorial board

Journal Guest Editor

2026 Co-editor (with Andrei Tchernykh, Reyes Juárez Ramírez, and Carlos A. Fernández) of a Special Issue in the journal of **Programming and Computer Software**, 2026, Springer, on "Next-Generation Computing: Trends, Challenges, and Opportunities". JCR IF 0.7. Q4 (Scimago/Scopus: Q3),

Program committee member

CONISOFT 2026 **International Advisory Board Member, 14th International Conference on Software Engineering Research and Innovation**, Zacatecas, Mexico, October 27 - 31, 2026

ICSC-CITIES 2025 **VIII Ibero-American Congress of Smart Cities**, Puebla, Mexico, November 10 - 12, 2025

ICSC-CITIES 2024 **VII Ibero-American Congress of Smart Cities**, San Carlos, Costa Rica, November 12 - 14, 2024

ICSC-CITIES 2023 **VI Ibero-American Congress of Smart Cities**, Mexico City, November 13 - 17, 2023

SIoTEC 2023 **4th Workshop on Secure IoT, Edge and Cloud systems**, Bangalore, India, May 1-4, 2023

ICSC-CITIES 2022 **V Ibero-American Congress of Smart Cities**, Cuenca, Ecuador, November 28 - 30, 2022

SIoTEC 2022 **3rd Workshop on Secure IoT, Edge and Cloud systems**, Taormina, Italy, May 16-19, 2022

ICSC-CITIES 2021 **IV Ibero-American Congress of Smart Cities**, Cancun, Mexico, November 29 - December 1, 2021

Journal reviewer

Expert Systems With Applications, Elsevier, IF 7.5 Q1

Ad Hoc Networks, Elsevier, IF 4.8 Q1

Neurocomputing, Elsevier, IF 6.5 Q1

Connection Science, Taylor & Francis, IF 3.2 Q2

Applied Artificial Intelligence, Taylor & Francis, IF 2.8 Q3

Computer Science and Information Systems, IF 1.1 Q3

Thesis supervision

M.S. students

2024 - 2025 **Ixchel Dafne Avendaño Pacheco**, *"AIzheimer's Disease Privacy-Preserving Classification by Magnetic Resonance Images Federated Learning."*, CICESE Research Center, Department of Computer Science (co-supervision)

2023 - 2024 **Marianne Salgado Ramos**, *"Methods and tools for the optimization of privacy-preserving Neural Networks for image processing in a non-secure environment."*, CICESE Research Center, Department of Computer Science (co-supervision)

B.S. students

Jan - Oct 2022 **Josue Daniel Ruiz Portilla**, *"Multi-objective optimization in planning tourist routes with an environmental penalty and user experience."*, Universidad Veracruzana, Department of Computer Science (co-supervision)

Research interests

- Combinatorial optimization: Multi-Objective Evolutionary Algorithms
- Privacy-preserving machine learning: Homomorphic Encryption cryptosystems
- Scheduling, load balancing, and resource allocation on distributed systems.
- Quality of service, energy consumption, and security on cloud computing.
- Smart cities and data analytics