José Cabrero Holgueras

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Objective

I am a passionate for Computer Science. During my career I have worked in Deep Learning, Modern Cryptography and Compilers. I research and learn new cloud-native technologies in my spare time, such as Docker and Kubernetes. I would love to work in multidisciplinary teams, where I can put into practice my skills and knowledge and help grow applications for the world. I look for building excellent applications that make the world a better place.

Experience

- **CERN Doctoral Student Programme** — Geneva, Switzerland
  CERN, IT Department, CERN Openlab — *Nov. 2019 – Nov. 2022*
  - **Topic**: Privacy Preserving Technologies for Deep Learning
  - **Tasks**: Development of applications based on Homomorphic Encryption, Secure Multiparty Computation, and Differential Privacy. Adaptation of DL models for use with Packed Homomorphic Encryption.
  - **Living Lab Project**: Towards secure and private use of healthcare data for data analytics of patients data.
  - **Quantumacy Project**: Development of a distributed medical data analysis application based on Homomorphic Encryption encapsulated with Quantum Key Distribution.
- **CERN Summer Student Programme** — Geneva, Switzerland
  CERN, Experimental Physics Group, Detector Technologies Department (EP-DT-DD) — *Jun. 2018 – Sep. 2018*
  - **Project**: Development of a Readout and Management System for Radiation Detection Sensors.
  - **Task**: Gathering requirements from the project description and other users of the system. Setting up an embedded web server on an Arduino YUN (IoT device). Performing stress tests to guarantee resilience and reliability of the server. Creation of a minimal web application able to run on such a small platform.
- **Research Assistant for C++ 20 Contract Specification Development** — Madrid, Spain
  ARCOS group, Computer Science and Engineering Department, University Carlos III of Madrid.Sep. 2017 – Jun. 2018
  - **Support for Contract-Based Programming on the Clang compiler**: Implementation of the C++ Standard **P0542R5** specification. Building proofs of concept of the different features. Testing and performance evaluation.
  - **Logistics assistant at the fifth C++ conference (using std::cpp)**: November 2017.
  - **Volunteer at T3chFest (Technology and Informatics Conferences)**: March 2018.

Education

- **Ph.D. in Computer Science and Technology** — Madrid, Spain
  University Carlos III of Madrid — *Nov. 2019 – Now*
  - **Privacy Preserving Techniques for Deep Learning**: Elaboration of solutions based on Secure Multiparty Computation and Homomorphic Encryption. Security analysis of techniques. Understanding the combination of Federated Learning with Homomorphically Encrypted Aggregation. Application of Secure Multiparty Computation for data sharing problems in healthcare.
- **M.Sc. in Cybersecurity** — Madrid, Spain
  University Carlos III of Madrid; Major in Cybersecurity — *Sep. 2018 – Jul. 2019*
  - **English**: 100% of credits in English within an international environment.
  - **GPA**: 9.25/10.0. Best Student Award and 3 Subjects graded with Honours Distinction.
  - **M.Sc. Thesis**: A Methodology for Large-Scale Identification of Related Accounts in Underground Forums (Supervisor: Sergio Pastrana).
  - **Relevant Coursework**: Identification & Authentication, Cybersecurity Management & Administration, Cyberdefense Systems, Data Protection, Cyberattack Techniques and Software Systems Exploitation.

- **B.Sc. in Computer Science and Engineering** Madrid, Spain
  University Carlos III of Madrid; Minor in Computer Engineering; EUR-ACE Label. *Sep. 2014 – Jul. 2018*
  - **Bilingual**: 96% of the credits coursed in English within an international environment.
  - **Last course GPA**: 9.56/10.00 (3.82/4.00).
  - **Global**: Top 5%; 16 subjects graded with Honours Distinction and 9 subjects with Outstanding.
  - **B.Sc. Thesis**: Support for Contract Based Programming on Modern C++ (10.0/10.0 Honours Distinction) (Supervisor: José Daniel García Sánchez).
  - **Relevant Coursework**: Artificial Intelligence, Heuristics & Optimization, Security Engineering, Distributed Systems, Real-Time Systems, Computer Networks and Software Projects Development Management.

Skills

- **Programming Languages**: Proficent: Python and Golang. Others: C++, Bash, SQL, Javascript and LaTeX.
- **Privacy Preserving Techniques**: Homomorphic Encryption (Microsoft SEAL, Lattigo, TFHE, Concrete), Federated Learning (Flower). Also development of privacy-preserving DL models based on Homomorphic Encryption.
- **Distributed Systems and Computer Networks**: Sockets, RPC and GRPC, REST Microservices.
- **System Administration**: Linux (Advanced), Windows (Basic), Docker, Git, Ansible, Kubernetes, Firewalling (iptables). Also embedded systems: Raspberry Pi and Arduino.
- **Deep Learning Frameworks**: Tensorflow, Keras, NumPy, ScikitLearn and general data analytics in Python.
- **Machine Learning Stanford University Online**: Development of ML Algorithms. Linear Regression, Logistic Regression, Artificial Neural Networks, Anomaly Detection, Recommender Systems and SVM. Principal Component Analysis (PCA) for Dimensionality Reduction and Working with **Large Scale Datasets (Big Data)**.
- **Deep Learning Specialization Coursera deeplearning.ai** : Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter tuning and Optimization, Structuring Machine Learning Projects, Convolutional Neural Networks, and Sequence Models. Also Computer Vision and Generative Adversarial Networks (GANs).
- **Other Skills:**: Pentesting and Audit (Nmap, Nikto, Metasploit, and others), Android App Development (Android Studio), Web Development (HTML5, CSS3, Javascript, Materialize, Node.js, Django, Flask), compilers (Clang C++ compiler), reversing and computer forensics.

Publications

- **Cabrero-Holgueras, J.**, & Pastrana, S. (2021). A Methodology For Large-Scale Identification of Related Accounts in Underground Forums. Computers & Security, 111, 102489.
- **Cabrero-Holgueras, J.**, & Pastrana, S. (2021). SoK: Privacy-preserving computation techniques for deep learning. Proceedings on Privacy Enhancing Technologies, 2021(4), 139-162.

Awards

- **Best Extended Abstract at Italian Congress for Telemedicine Society**: Usable Homomorphic Encryption for Private Telemedicine on the Cloud. October 2021.
- **Random Power Hackathon First Prize**: Project: True Random Privacy; Denoising of images applied to Quantum Random Differential Privacy. October 28–30, 2020.
- **Best Student of the Year M.Sc. in Cybersecurity**: Universidad Carlos III de Madrid. Award to the students with the best GPA of each Master Course Degree. 2018/2019
- **CERN Summer Student Webfest Hackathon Winner**: Second prize, App: "Guess what particle", (source code: gitlab.cern.ch/jcabrero/whoiswho); Geneva, Switzerland, July 27–29, 2018.
- **Excellence Scholarship**: Community of Madrid, to facilitate the development of university education of students with an excellent academic achievement, 2017/2018.

Languages

- **Spanish**: Native.
- **English**: Advanced or Professional Competencies (C1).
- **French**: Upper-Intermediate (B1).

Interests

- **Hobbies**: Cuisine, Social Events, Sports (soccer and padel), Videogames, Travelling and Home Labbing.