

# Robert Serrano Kobylansky

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## Personal Profile

A Bachelor's student in Nanotechnology, with a focus on software engineering, robotics, and artificial intelligence, 2 internships of professional experience at Facebook including 1 patent application, and multiple high-stakes engineering projects in robots, rovers, and high-power rocketry. Proficient in multiple programming languages, and standard software engineering practices. Knowledgeable of algorithms and data structures. 3 time ICPC Mexico finalist. Experienced in embedded software and hardware development.

## Skills

<b>Programming Languages</b>	C, C++, Rust, Python, Java, Kotlin, JavaScript, MATLAB, Julia
<b>Software Engineering</b>	Git, Linux, OpenCV, GStreamer, ROS, HTTP, WebSocket, Audio Processing, Parallel Computing
<b>Embedded Development</b>	KiCAD, Arduino, ESP32, STM32, RP2040, I2C, SPI, UART, USB, LoRa, Bluetooth, GPS, SPICE Simulation
<b>Languages</b>	Spanish (Native), Russian (Native), English (Proficient), German (Basic)

## Education

### National Autonomous University of Mexico

Ensenada, Mexico

BSc in Nanotechnology

Aug 2019 - Jun 2023 (Expected)

- Specialized in microelectronics and nanofabrication
- Lead the initiative to establish the first official ICPC competition site of Baja California in our faculty.
- Mentor in programming and mathematics.
- Teached algorithms and data structures class.
- Math Courses:** Mathematical Methods II (with differential equations and programming in MATLAB), Multivariable Calculus, Complex Analysis, Linear Algebra, Probability and Statistics.
- Science Courses:** Modern Physics, Thermodynamics, Electromagnetism, Biochemistry, Quantum Mechanics, Optics.
- Nanotechnology Courses:** Semiconductor Devices, Materials Engineering II, Nanofabrication II, Nanomaterial Synthesis & Characterization, Electronic Microscopy, Nanomaterials for Energy Storage.

## Work Experience

### Meta (Formerly Facebook)

Menlo Park, CA

Software Engineering Intern

Jun 2022 - Aug 2022

- Sped up audio processing model inference on embedded devices by 300% via multithreading.
- Joint inventor for patent application.
- Collaborated with research team, and provided valuable feedback on model performance.
- Integrated model inference in RTC audio pipeline. Moved slow code in Android's Java layer to native C++.
- Developed UI for switching model and audio pipeline parameters for quick real-world testing and rapid feedback on performance.
- Fixed bugs in PyTorch codebase for compilation of operators for ARM devices.
- Technical Skills:** PyTorch, C++, Java, Kotlin, Android, Linux, Mercurial
- Soft Skills:** Synthesis and presentation of results, Communication and collaboration with multiple engineering and research teams.

### Facebook

Remote

Software Engineering Intern

Jul 2021 - Aug 2021

- Developed back-end for transfer learning for model parameters with sparse and dense features.
- Created algorithm that improved matching of features from  $O(n^2)$  to  $O(n \log(n))$ .
- Worked with data scientists to improve performance of personalization models.
- Technical Skills:** Python, Caffe2, Linux, Mercurial
- Soft Skills:** Proactive communication with data scientists.

## Other Experience

### Lead Systems Engineer

UABC Experimental Rocketry Team "CIUDSE"

Oct 2022 - Jun 2023

- Organization and management of multiple engineering teams for "CIMARRON III", a 10k AGL mission for Spaceport America Cup 2023
- Engineering of complete rocket system: airframe, recovery, propulsion, avionics, and payload.
- Preparation of technical reports and presentations.
- Development of real-time video transmission payload and directional tracking ground station for live-streaming from the rocket during flight.
- Technical Skills:** SolidWorks, MATLAB, LaTeX, Rust, Python
- Soft Skills:** Leadership, Resource management, Communication with multidisciplinary teams, Teamwork, Presentation skills, Report writing

## Ground Station Lead

UABC Experimental Rocketry Team "CIUDSE"

Feb 2021 - Sep 2022

- Developed a telemetry server from scratch with time-series database integration for real-time and historical queries.
- Designed and assembled telecommunications hardware for reliable, long-range, real-time telemetry from the rocket.
- Telecommunications protocol firmware for rocket flight computer and ground station.
- Development of real-time video transmission payload and directional tracking ground station for live-streaming from the rocket during flight.
- Development of front end for visualization of real-time and historical telemetry based on NASA's OpenMCT.
- Development of plug-in for visualization of geodetic data on a 3D Earth representation or on a 2D map, integrating with telemetry from OpenMCT.
- **Technical Skills:** STM32, ESP32, GPS, C, C++, Python, JavaScript
- **Soft Skills:** Leadership, Teamwork, Presentation skills, Technical report writing

## Team Captain

CNyN Programming Club & ICPC Team

Aug 2020 - Present

- Founded programming club in our faculty
- Lead the initiative to establish the first official ICPC competition site of Baja California in our faculty.
- Coached 4 teams for 2022 ICPC season.
- ICPC Mexico finalist in 2020, 2021, and 2022 seasons.
- **Technical Skills:** C++, Python, Algorithms, Data Structures
- **Soft Skills:** Leadership, Teaching, Preparation of didactic material.

## Software Lead

"Cassiopeia" Rover Team

Feb 2019 - Feb 2020

- 2nd place in national rover competition "HUBL 2019"
- Development of firmware for control of drivetrain and control of rock manipulating arm.
- Design and construction of actuated camera for remote control view panning.
- Development of optimized video pipeline with GStreamer for low latency video transmission, using Jetson Nano and WiFi.
- Development of remote control interface with telemetry visualization, video link and real-time control via a WiiMote.
- **Technical Skills:** C++, ROS, Linux, GStreamer, OpenCV, Arduino, UART, I2C, WiFi, Bluetooth

## Projects

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Ignition4 Flight Computer

2022 - 2023

- Designed and fabricated a flight computer for high powered rocketry. Developed software for rocket recovery, data logging, and user interface.
- Flight computer is based on ESP32-C3 microcontroller. Uses bluetooth for configuration. Includes 2 pyro channels for dual recovery.

Autonomous Rover with Object Recognition

2018

- Control and objective modification via web interface.
- Autonomous navigation to target object, with obstacle detection.
- OpenCV target detection, motor control, and sensor signal processing on RaspberryPi

Warehouse Storage Optimizer

2023

- Worked with manufacturer to optimize storage of inventory.
- Integrated inventory database for automatic weekly assignment of storage units.

School Schedule Optimizer

2022

- Created a tool to facilitate the process of creating school schedules and balancing the students' and professors' preferences.
- Algorithm based on simulated annealing. Multithreaded implementation written in Rust. UI was made using egui library.

Phonebook Format Updater

2020

- In 2020, there was a change in the way Mexican mobile phone numbers were dialed. This program used the Google Contacts API to quickly update all your phonebook to the new format. Written in Python.

Mancala AI

2019

- A Mancala playing agent. Outperformed all online bots available on online playing platforms.
- Uses min-max search with alpha-beta pruning.

## Achievements

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2023	<b>Qualified</b> , Spaceport America Cup 2023	Las Cruces, NM
2022	<b>Finalist</b> , ICPC Mexico	Guadalajara
2022	<b>Qualified</b> , Spaceport America Cup 2022 (First Mexican team to qualify)	Las Cruces, NM
2021	<b>1st Place</b> , "ENMICE 2021" National Rocketry Competition	Tijuana
2021	<b>Finalist</b> , ICPC Mexico	Mexico City
2021	<b>3rd Place in Mexico</b> , Google Kick Start 2021 Round D	Mexico
2020	<b>Finalist</b> , ICPC Mexico	(Remote)
2020	<b>2nd Place</b> , "HUBL 2019" National Rover Competition	Ensenada