

# Intern with Oracle Labs MLE!

Are you looking for an exciting internship opportunity? If so, this might be the perfect fit for you. The MLE team at Oracle Labs has an opening for an internship to help extend MLE with new exciting functionality!

## Oracle

Oracle, a global provider of enterprise cloud computing, is empowering businesses of all sizes on their journey of digital transformation. Oracle Cloud provides leading-edge capabilities in software as a service, platform as a service, infrastructure as a service, and data as a service.

Oracle's application suites, platforms, and infrastructure leverage both the latest technologies and emerging ones – including artificial intelligence, machine learning, blockchain, and Internet of Things – in ways that create business differentiation and advantage for customers. Continued technological advances are always on the horizon.

## Oracle Labs

Oracle Labs is the advanced research and development arm of Oracle. We focus on the development of technologies that keep Oracle at the forefront of the computer industry. Oracle Labs researchers look for novel approaches and methodologies, often taking on projects with high risk or uncertainty, or that are difficult to tackle within a product-development organization. Oracle Labs research is focused on real-world outcomes: our researchers aim to develop technologies that will someday play a significant role in the evolution of technology and society. For example, chip multithreading and the Java programming language grew out of work done in Oracle Labs.

## Multilingual Engine (MLE)

Stored procedures, user-defined functions and triggers - in general server-side procedural logic - complement SQL processing and are an important part of many database applications, in particular in enterprise environments. Multilingual Engine (MLE) [1] is a feature of Oracle Database that enables the use of modern programming languages like JavaScript for server-side procedural logic. MLE is based on GraalVM, a high-performance embeddable virtual machine developed at Oracle Labs that supports a multitude of programming languages. On the basis of GraalVM [2], MLE builds a platform for efficient, scalable program execution in Oracle Database that is tightly integrated with processing of relational and non-relational data. Multilingual Engine has been released as a feature of Oracle Database and Autonomous Database and initially allows the execution of JavaScript directly within the database.

The Multilingual Engine team at Oracle Labs works on further developing this platform to provide innovative features for database applications. Internships in the Multilingual Engine team at Oracle Labs offer the opportunity to work with state-of-the-art database and virtual machine technology, and have direct impact on the world's premier database system.

## Internship Details

The goal of this project is to extend MLE and research new possibilities. We offer various topics depending on the skills and the interests of the candidate:

### WebAssembly for In-Database Applications

Combined with JavaScript, WebAssembly allows the safe, sandboxed execution of languages like Rust and C/C++. Next to the Web platform, WebAssembly is a promising technology for example for edge computing platforms. In this internship, we will explore WebAssembly as a means to enable languages like Rust and AssemblyScript for application code in database systems. We will extend the Multilingual Engine with WebAssembly support, develop SDKs for WebAssembly-based programs to access database functionality and explore performance aspects.

### Location Optimization for Data-Driven Microservices

Enterprise applications structured into microservices typically feature services that interact heavily with database systems as the persistent data store. These services can benefit from being located close to the database system in order to minimize network interaction. Deployment to FaaS platforms offers the opportunity to optimize the placement of services, for example in close proximity to the database. In this project, we will explore techniques to automatically optimize the placement of data-driven microservices based on communication patterns.

### Instrumentation of User Code in MLE

Developers rely on code inspection tools in order to deliver maintainable and performant applications. GraalVM provides an instrumentation framework to collect information about code execution with low overhead. Over the course of the internship we will integrate such instrumentation to collect code coverage and profiling information. We will build the functionality to provide this information in a clear and concise way.

## References

[1] [https://docs.oracle.com/en/database/oracle/oracle-database/21/arpls/dbms\\_mle.html](https://docs.oracle.com/en/database/oracle/oracle-database/21/arpls/dbms_mle.html)

[2] <https://www.graalvm.org/>



Image Caption 1. Our beautiful offices at Prime Tower in Zurich.

## Required Skills

The person stepping into this role is expected to complete the internship using a wide and diverse set of skills.

- Basic understanding of databases and SQL (having completed advanced database implementation courses is a plus)
- Experience with C and Java programming. Experience with JavaScript is a plus
- Experience with Linux (e.g., bash scripts)
- An average grade of at least 5.0 in the master studies is a plus

## Internship Facts

The duration of the internship can vary based on the candidate's constraints. The usual duration is 6 months. We pay a competitive salary. The research topics listed are informative, we are open to suggestions depending on your skills and qualifications. By sending in your application, you opt-in for processing your personal information.

If this sounds like you, we hope to meet you!

## How to Apply

After reviewing the [Oracle Labs internship program](#), please provide us with the following information to apply:

- Your CV or link to your home page containing your curriculum
- Description of your motivation and area(s) of interest
- Availability and preferred internship duration
- Preferred location

If available, please apply to this topic via the internship portal of your university. Alternatively, send an email with the aforementioned information to [mle-jobs\\_ww@oracle.com](mailto:mle-jobs_ww@oracle.com).

“During my six-month internship at Oracle Labs, I had the opportunity to explore an exciting research direction using the company's technologies. I had to dive deep into the inner workings of a novel language implementation framework and a JIT compiler, among many other things. The experience gave me more confidence in my abilities as a programmer and showed me where I still have room to grow. People at the company were responsive to my questions and were eager to help. Overall, I had a great time at the Labs.”

**Aleksei Kashuba**  
EPFL student, now  
employed by Oracle  
Labs, 6-months intern

## About Us

Innovation starts with inclusion at Oracle. We are committed to creating a workplace where all kinds of people can be themselves and do their best work. It's when everyone's voice is heard and valued, that we are inspired to go beyond what's been done before. That's why we need people with diverse backgrounds, beliefs, and abilities to help us create the future, and are proud to be an affirmative-action equal opportunity employer.

Oracle is an Equal Employment Opportunity Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, sexual orientation, gender identity, disability and protected veterans status, age, or any other characteristic protected by law. Oracle will consider for employment qualified applicants with arrest and conviction records pursuant to applicable law.

## Life at Oracle

An Oracle career can span industries, roles, countries and cultures, giving you the opportunity to tackle new roles and challenges, while blending work and life. Oracle has thrived through 40+ years of change by innovating and operating with integrity while delivering for the top companies in almost every industry. To nurture the talent that makes this happen, we work hard to build a vibrant and inspiring workplace that celebrates diverse, hardworking teams where everyone can contribute. We take care of each other, and value giving back to the community. We have flexible work arrangements and offer benefits including generous paid parental leave and comprehensive premium medical insurance.

We will ensure that individuals with disabilities are provided reasonable accommodation to participate in the job application or interview process, to perform crucial job functions, and to receive other benefits and privileges of employment. Please contact us to request accommodation.

At Oracle, we don't just respect differences—we celebrate them. We believe that innovation starts with inclusion and to create the future we need people with diverse backgrounds, perspectives, and abilities. That's why we're committed to creating a workplace where all kinds of people can do their best work. It's when everyone's voice is heard and valued that we're inspired to go beyond what's been done before.

[More information on Oracle's stance on diversity and inclusion](#)