# Catarina **Gamboa**

Software Engineering PhD Student

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I am interested in both the Design of Programming Languages and Usable Software Verification. My current projects aim to enhance software reliability by integrating Software Verification with Human-Computer Interaction techniques, thereby creating tools that are valuable, practical, and usable by developers in their everyday work.

## EDUCATION

**2021–Now** | **Dual PhD in Software Engineering**
CARNEGIE MELLON UNIVERSITY AND UNIVERSITY OF LISBON · Pittsburgh and Lisbon 🏛
She is enrolled in the Dual PhD CMU-Portugal completing courses and research at both CMU and U. Lisbon. Currently, she is working on improving the usability of Liquid Types for Reliable Software, advised by Alcides Fonseca and Jonathan Aldrich.

**2019–2022** | **Master Degree in Informatics Engineering - Software Engineering**
FACULDADE DE CIÊNCIAS DA UNIVERSIDADE DE LISBON · Lisbon 🏛
GPA of 18/20. The courses included Software Design (18/20), Compiling Techniques (19/20), Software Reliability (18/20), and Software Verification and Validation (18/20). Final Dissertation on "LiquidJava: Extending Java with Refinements" advised by Alcides Fonseca and Chris Timperley.

**2016–2019** | **Undergraduate Studies in Informatics Engineering**
FACULDADE DE CIÊNCIAS DA UNIVERSIDADE DE LISBON · Lisbon 🏛
GPA of 17/20. The courses included Algorithms and Data Structures (18/20), Principles of Programming (20/20), Construction of Sotware Systems (18/20), and Information Systems Analysis and Design (18/20).

## PROFESSIONAL EXPERIENCE

**2023 - now** | **Teaching Assistant for API Design**
CARNEGIE MELLON UNIVERSITY
Catarina is one of the Teaching Assistants of API Design working with Joshua Bloch.

**2020-Now** | **Researcher at LASIGE and S3D**
UNIVERSITY OF LISBON AND CARNEGIE MELLON UNIVERSITY
Catarina started doing research at LASIGE during her master thesis and is currently a researcher at both LASIGE and the Software and Societal Systems Department (S3D) at CMU.

**2019-2020** | **Teaching Assistant in the Informatics Department (Monitor)**
FACULDADE DE CIÊNCIAS DA UNIVERSIDADE DE LISBOA
Taught courses on Programming for more than 100 undergraduate students of Information Technology, Mathematics, Physics and others. The courses were Programming I (LTI), Programming II (LTI) and Programming II

**Jul 2019** | **Summer Internship**
RUNTIME REVOLUTION
She had a summer internship in a company of software development, developing a project using Ruby on Rails and React.

## PUBLICATIONS

### FULL PAPERS

**May 2023** | **Usability-Oriented Design of Liquid Types for Java**
Catarina Gamboa, Paulo Santos, Christopher S. Timperley, and Alcides Fonseca. 📄
2023 IEEE/ACM 45th International Conference on Software Engineering (ICSE), CORE A*.

## Short Papers, Posters and Demos

**Oct 2023** | **Latte: Lightweight Aliasing Tracking for Java**
Conrad Zimmerman, Catarina Gamboa, Alcides Fonseca, Jonathan Aldrich 📄
IWACO'23 and HATRA'23 - International workshop on Aliasing, Capabilities and Ownership, and International Workshop on Human Aspects of Types and Reasoning Assistants

**Oct 2022** | **Poster - LiquidJava: Improving the Usability of Liquid Types for Reliable Software**
Catarina Gamboa, Alcides Fonseca, and Jonathan Aldrich 📄
2022 CtLab Partners Conference, at Carnegie Mellon University, Pittsburgh

**Mar 2022** | **DEMO - Dive into LiquidJava - Extending Java with Liquid Types**
Catarina Gamboa, Paulo Santos, Christopher S. Timperley, and Alcides Fonseca. 🔗
Posters and Demonstrations track at <Programming> 2022 - International Conference on the Art, Science and Engineering of Programming

**Jan 2022** | **Understandable and Useful Error Messages for Liquid Types**
Alcides Fonseca, Catarina Gamboa, João David, Guilherme Espada, Paulo Canelas 🔗
WITS'22 - Workshop on the Implementation of Type Systems 2022, co-located with POPL'22

**Oct 2021** | **User-driven design and evaluation of Liquid Types in Java**
Catarina Gamboa, Paulo Santos, Christopher S. Timperley, and Alcides Fonseca 🔗
HATRA'21 - Human Aspects of Types and Reasoning Assistants Workshop, co-located with SPLASH'21.

**Sep 2021** | **LiquidJava: Adding Lightweight Verification to Java**
Catarina Gamboa, Paulo Santos, Christopher S. Timperley, and Alcides Fonseca 📄
INForum 2021 - Informatics Symposium.

**Nov 2020** | **Extending Java with Refinements**
Catarina Gamboa, Paulo Santos, Christopher S. Timperley, and Alcides Fonseca 🔗
PSSV'20 - Program Semantics, Specification and Verification: Theory and Applications, Student Paper

## Talks

**Dec 2022** | **Guest Talk at Secure Coding**
CARNEGIE MELLON UNIVERSITY
Invited by Hanan Hibshi to give a talk about LiquidJava in the course Secure Coding, 14735, Fall 2022.

**Jul 2022** | **Science Communication and the Media**
LASIGE, Faculdade de Ciências da Universidade de Lisboa 🔗
Presentation about the importance of Science Communication to broad audiences using media resources. Short version presentated at the 1st LASIGE FORUM and a full-version presented in Talks@LASIGE.

## Ongoing Projects

**July 2023 - now** | **Understanding the usability barriers in Liquid Types**
Liquid Types improve software reliability by finding bugs at compile-time as it has been shown in many papers. However, they are yet to be widely used. Therefore, this project aims to investigate what are the usability issues and improvements that can make liquid types more widely used by applying exploratory qualitative techniques (e.g., contextual inquiries, interviews, usability studies).

**July 2023 - now** | **LiquidJava - Formalization of Liquid Types in Java**
After designing LiquidJava with a focus on usability, this project aims to formalize the language and the interesting properties of integrating liquid types in Java. The first step was accomplished by adding a lightweight aliasing tracking technique in Java (Latte) that will be leveraged to reason about strong updates where liquid types are present.

## Conference Committees

| 2023 | **SPLASH'23 - Student Volunteer Co-Chair** *(website)* |
| | Cascais, Portugal |
| | Catarina is part of the organizing committee to organize the volunteering team for the conference that will happen in Lisbon in October 2023. |
| 2023 | **PLDI'23 - Artifact Evaluation Committee** *(website)* |

## Outreach, Leadership and Teamwork

| May 2023 | **Student Volunteer at ICSE 2023** |
| | Melbourne, Australia |
| | Participated as a student volunteer in the organization of the conference that counted with 1500 participants. |
| 2021-2023 | **Student Volunteer at POPL 2021, 2022 and 2023** |
| | Participated as a student volunteer in three consecutive years helping in the organization of the event in online, hybrid and in-person versions. |
| 2021-2022 | **Co-organization of events at LASIGE** |
| | Joined the organizer committee for the LASIGE Welcome Day 2021 and 2022, organized team building activities such as paintball and movie nights for all members of the research unit, joined the PhD student commission to help improve the wellbeing and connection among PhD students. |
| 2019-2022 | **Board Member of the non-profit cultural organization Associação Alegres Olhares** |
| | Elected board member of the non-profit cultural association Alegres Olhares in the last two elections for the corporate entities. The association organizes and co-organizes cultural projects using creativity to take the traditional projects to our present day. |
| 2010-now | **Participation in Music and Theater Groups** |
| | Plays concert flute in the Band of the Phillarminic Society of Olhalvo and belongs to the folk music group Noses com Vozes. She also participated in multiple theater groups such as the Academic Theater of the University of Lisbon (TUT) and the SCS Musical group at CMU. |

## Awards

| Apr 2022 | **Huawei Scholarship** |
| | Was awarded with one of the 50 shcolarships given in the scope of Huawei's program Seeds For The Future 2.0, in collaboration with .PT, to empower students in the STEM areas. |
| Sep 2021 | **Award for Best Student Poster** |
| | Got the award for best poster for the work on "LiquidJava: Adding Lightweight Verification to Java" in the conference INFORUM - Informatics Symposium 2021. |
| 2021 | **MaxData Award - Informatics Excellence** |
| | Received the academic excellence award for the best student on the first year of the MSc on Informatics Engineering. |
| 2018-2020 | **Diploma of Academic Merit** |
| | Received academic excellence awards for the three years of the Bachelor degree. |

## Other Education

| Apr 2022 | **Science and the Media - bringing scientists, journalists and society** |
| | cE3c, Faculdade de Ciencias da Universidade de Lisboa ⚲ |
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| | **2nd Grade on Concert Flute** |
| | Had transverse flute classes since the age of 6 and in 2014 got the 2nd grade of transverse flute by the Torres Vedras Conservatory. |
| | **6th Grade on Classical Dance** |
| | Had classes of classical dance from 2006 to 2015 and achieved the 3rd Level of the "Certificate in Graded Examination in Dance" by Royal Academy of Dance, for the 6th grade of classical dance (ballet). |

# Other Activities

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| 2022, 2018 | **Monitor at Verão ULisboa and Ciências Open Day**<br>Faculdade de Ciências da Universidade de Lisboa<br>Helped in activities to promote Programming and Computer Science for high school students. |
| Jan 2019 | **Volunteer in the event Building the Future**<br>Microsoft and imatch<br>Participated as volunteer on the organization of the event Building the Future which joined technology, transformation and leadership to empower people and companies. The event was promoted by Microsoft in colaboration with imatch. |
| Jul 2017 | **Summer Course on Heritage and Creativity**<br>Instituto Politécnico de Leiria<br>Participation on the International Summer Course about Heritage and Creativity. |