

## Research Objectives and Research Questions

- RO 1: Improve IDE and LSP Generation
  - RQ 1.1: How can IDE generation be improved to support LSP and DAP?
  - RQ 1.2: What are the key challenges in generating LSP and DAP for different programming languages?
  - RQ 1.3: How can a universal LSP and DAP be developed to support multiple languages and IDEs?
- RO 2: Facilitate LSP and DAP Modularization
  - RQ 2.1: How can LSP and DAP modularization be facilitated in language workbenches?
  - RQ 2.2: What are the key challenges in modularizing LSP and DAP for different programming languages?
  - RQ 2.3: How can LSP and DAP modularization be integrated with existing language composition and modularization features in language workbenches?
- RO 3: Reduce to  $L \times 1$  the number of combinations to support  $L$  languages
  - RQ 3.1: How can the number of combinations required to support multiple languages be reduced to  $L \times 1$ ?
  - RQ 3.2: In what ways does simplifying the development process for language support enhance efficiency?
  - RQ 3.3: How does reducing combinations impact the speed and effectiveness of creating language support?
- RO 4: Leverage Neverlang for LSP and DAP in LPL Development
  - RQ 4.1: How can Neverlang's LPL development features be leveraged for creating a reusable core for LSP and DAP functionalities?
  - RQ 4.2: What are the key benefits of using Neverlang for LSP and DAP development in the context of LPLs?
  - RQ 4.3: How does leveraging Neverlang's LPL features enhance the scalability and efficiency of LSP and DAP development?

## Language Workbenches

- JustAdd -> Computer Science department of the Lund University (Lund, Sweden)
- Melange -> DiverSE research team at the Institut National de Recherche en Informatique et en Automatique (INRIA) (Paris, France)
- MontiCore -> Software Engineering group at the RWTH Aachen University (Aachen (Aquisgrana), Germany)
- MPS -> JetBrains Research (Saint Petersburg, Russia)
- Rascal -> Centrum Wiskunde & Informatica (CWI) (Amsterdam, Netherlands)
- SpooFax -> Delft University of Technology (Delft, Netherlands)
- Xtext -> Eclipse Foundation (Ottawa, Canada)
- Neverlang -> Università degli Studi di Milano (Milan, Italy)

## Journals and Conferences

- ACM (Association for Computing Machinery) -> New York, USA, 1947. It is the world's largest scientific and educational computing non-profit association.

## **Journals**

- JSS (Journal of Systems and Software)
- TSE (IEEE Transactions on Software Engineering)
- TOSEM (ACM Transactions on Software Engineering and Methodology)
- TOPLAS (ACM Transactions on Programming Languages and Systems)

## **Conferences**

- ICSE (International Conference on Software Engineering)
- PLDI (Programming Language Design and Implementation)
- OOPSLA (Object-Oriented Programming, Systems, Languages, and Applications)
- SLE (Software Language Engineering)

## **Important Figures**

- Martin Fowler: Renowned for his work on software development methodologies. His book “Domain-Specific Languages” is a seminal work in the field.
- Markus Voelter: Known for his contributions to the development and promotion of language workbenches like JetBrains MPS.
- Eelco Visser: A professor at Delft University of Technology, Visser has made significant contributions to the field through his work on the Spoofax language workbench.
- Gregor Kiczales: Known for his work on aspect-oriented programming (AOP).
- Antonia Bertolino: Known for her work on software testing and quality assurance.

## Questions for PhD Interview

### **“Why do you want to do a PhD?”**

I want to pursue a PhD for several reasons. Firstly, I have a deep passion for [your field of study], and I am eager to contribute to advancing knowledge in this area. Throughout my academic journey, I have been fascinated by [specific aspect of your field], and I believe that a PhD will provide me with the rigorous training and research opportunities necessary to make meaningful contributions.

Secondly, I thrive in collaborative environments. I find that working with others not only enhances my own understanding but also leads to more innovative and impactful research outcomes. While I know that I will be working alone, I am confident that the skills and insights I have gained from previous collaborations will greatly benefit my independent research.

Additionally, I see a PhD as a critical step toward my long-term career goals. I aspire to [specific career aspiration, e.g., “become a professor and conduct independent research”], and the skills and knowledge I will gain from this program are essential for achieving these objectives. I am committed to continuous learning and professional growth, and I believe that a PhD will equip me with the expertise and experience necessary to excel in my future career.

### **“Why did you choose this specific field of study?”**

I chose this field because of my deep interest in [specific aspect or topic]. During my undergraduate/graduate studies at [previous institution], I was particularly drawn to [related course or project], which sparked my passion for [field]. My experiences with [specific projects or research] further solidified my decision.

### **“How does your previous work prepare you for this PhD program?”**

My previous work has equipped me with the necessary skills and knowledge for this PhD program. For instance, my experience with [specific project or job] taught me [relevant skills], and my involvement in [another relevant experience] helped me develop [another relevant competency]. Additionally, my publications and collaborations in [specific area] have prepared me to contribute meaningfully to this program.

### **“What are your career aspirations after completing your PhD?”**

After completing my PhD, I aspire to pursue a career in [academic/industry/non-profit research]. I am particularly interested in [specific role or sector], where I can [desired impact or contribution]. My long-term goal is to [broader career objective], which aligns with the skills and knowledge I will gain during this PhD program.

### **“How do you see your research evolving in the next few years?”**

In the next few years, I envision my research evolving to address [related emerging questions or new directions]. I aim to expand my work by [mention potential collaborations, new techniques, or additional funding]. This will allow me to explore [new aspects or applications] of my current research and contribute more comprehensively to the field.

### **“Why did you choose our university and this PhD program?”**

I chose your university and this PhD program because of its strong reputation in [specific field], as well as the opportunity to work with esteemed faculty members like [specific professor]. The resources and facilities available, such as [specific labs or centers], are particularly appealing. Additionally, the university’s commitment to [specific value or initiative] aligns with my own academic and professional goals.

**“How do you plan to contribute to our academic community?”**

I plan to contribute to your academic community by actively participating in [seminars, workshops, or conferences]. I am also eager to collaborate with fellow researchers and contribute to ongoing projects within the department. Furthermore, I hope to engage with students through teaching or mentoring, sharing my expertise and fostering a collaborative learning environment.

## **Additional Resources**

### **Journals**

- CACM (Communications of the ACM)
- SCP (Science of Computer Programming)
- STTT (Software and Systems Modeling)
- JOT (Journal of Object Technology)
- JFP (Journal of Functional Programming)
- SCP (Science of Computer Programming)

### **Conferences**

- SPLC (Software Product Line Conference)
- ICPC (International Conference on Program Comprehension)
- SPLASH (Systems, Programming, Languages, and Applications: Software for Humanity)
- POPL (Principles of Programming Languages)
- MODELS (Model Driven Engineering Languages and Systems)
- ECOOP (European Conference on Object-Oriented Programming)
- ESEC/FSE (Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering)
- ASE (Automated Software Engineering)
- ICFP (International Conference on Functional Programming)
- ESOP (European Symposium on Programming)
- VMCAI (Verification, Model Checking, and Abstract Interpretation)
- GPCE (Generative Programming and Component Engineering)