Declarative Language Definition with the **Spoofax** Language Workbench

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What is Spoofax?

A tool for implementing programming languages
- Open source and freely available
- Used in education, research, and industry
- Requires a lot of software engineering to maintain

A long term research project
- Incubator for language engineering research
- Basis for implementation and evaluation of 100+ papers
- Imperfect approximation of the ideal language workbench
Language Implementations from Declarative Language Definitions
Goals of Spoofax

Language definition
- Define syntax and semantics of (domain-specific) programming languages

High-level and Understandable
- Can be used as reference documentation

Executable
- Can be used to generate tools

Declarative
- No need to understand algorithms

Multi-purpose
- Derive many/all tools from single definition

Correct by Construction
- Implementations sound wrt declarative semantics
Spoofax History

Stratego/XT [1997-2005]
- Command-line language processors with SDF + Stratego (C/Linux)

Spoofax [2006-2011]
- Eclipse (IMP) IDEs from SDF + Stratego + ESV (Java)

Spoofax 2 [2012-2020] (this tutorial)
- Spoofax-Core library with bindings for Eclipse, IntelliJ, command-line
- Meta-Languages: SDF3, Stratego, NaBL, NaBL2, Statix, DynSem, …

Spoofax 3 [2019-…]
- Live language development based on PIE build system
Research
- Language Engineering, Language Prototyping

Education
- Compiler Construction (MiniJava)

Academic Workflow Engineering
- WebDSL (researchr.org, WebLab, …)

Industry
- Oracle Labs: Graph Analytics
- Canon: Several DSLs
Meta-languages

- Syntax definition with SDF3
- Static semantics with Statix
- Data-flow analysis with FlowSpec
- Transformation with Stratego
- Dynamic Semantics with DynSem/Dynamix
- Editor service definition with ESV
Goal
- Demonstrate language development with Spoofax
- With focus on concepts behind two Spoofax meta-languages
- Using live programming, building a small (but not tiny) language

Part 1: Syntax
- Multi-purpose declarative syntax definition with SDF3

Part 2: Static Semantics
- Declarative specification of type systems with Statix
Tutorial Project on GitHub

https://github.com/MetaBorgCube/statix-sandbox/tree/master/london
Websites

Documentation

Compiler Construction Course

Publications

metaborg.org


eelcovisser.org
# spoofax-users @ Slack

Active community of users and developers

Questions and answers about technical issues

Send me an email for an invitation
Open Positions in Programming Languages

The Delft PL group is hiring!

We currently have the following open positions:

**PhD Student | Dependently Typed Programming Languages**
Contact: Jesper Cockx
Posted: January 2020

**PhD Student / Developer | Web Programming Languages**
Contact: Eelco Visser
Posted: January 2020

**PhD Student | Static Semantics Specification (TUD00118)**
Contact: Eelco Visser, Casper Bach Poulsen
Posted: January 2020

**PhD Student | Dynamic Semantics Specification (TUD00245)**
Contact: Casper Bach Poulsen, Eelco Visser
Posted: January 2020

**Student Programmer | Grammar Engineering in Spoofax Team**
Contact: Eelco Visser
Posted: January 2020

**Student Programmer | Web Engineering in AWE Team**
Contact: Eelco Visser
Posted: January 2020

**2 PhD students | Software Restructuring**
Contact: Eelco Visser, Casper Bach Poulsen
Posted: February 2020

**Two Assistant / Associate Professors | Programming Languages (TUD00153)**
Contact: Eelco Visser
Posted: April 2020

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