Arie Simeon Zwaan

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Date of birth: 02/09/1997 **Nationality:** Dutch

WORK EXPERIENCE

[02/2021 – Current] **PhD Candidate**

Delft University of Technology

City: Delft | **Country:** Netherlands

My project was to develop and improve tooling to derive type checkers from declarative specifications using scope graphs and Statix meta-language. I implemented backend improvements (incremental type checking, partial evaluation), designed alternative methods to use scope graphs, applied Statix to formerly unspecified language features and used Statix specifications to make transformations binding-preserving by design.

Although the position emphasized research, I was responsible for maintaining Statix as well. This involved for example bug-fixing, convenience feature development, documentation and integration into Spoofax.

Skills: (meta-)language theory and engineering, project management, analytical, critical and creative thinking, collaboration, and communication.

[07/2024 – Current] **Software Engineer**

Bettr Health B.V.

City: Ede | **Country:** Netherlands

At Bettr Health, I am developing a mobile app (using React Native) for a research project of a hospital in the US.

[05/2015 – 11/2019] **Software Engineer**

Philips VitalHealth

City: Uddel | **Country:** Netherlands

At Philips, I participated in model-based development and testing of e-health applications, mobile apps and supportive tooling.

Skills: software development, testing, team collaboration.

EDUCATION AND TRAINING

[08/2015 – 07/2018] **Bachelor of Science (cum laude)**

Delft University of Technology

City: Delft | **Country:** Netherlands | **Final grade:** 8.5 | **Type of credits:** ECTS | **Number of credits:** 180 | **Thesis:** Tooling to Detect Unwanted Thread exits in Rust

Major: *Computer Science and Engineering.*

Specialization (15 ECTS): *Embedded Software Engineering.*

Minor: *Finance* at TU Delft, EEMCS, Mathematics Department.

[09/2018 – 01/2021] **Master of Science (cum laude)**

Delft University of Technology

City: Delft | **Country:** Netherlands | **Final grade:** 9 | **Type of credits:** ECTS | **Number of credits:** 121 | **Thesis:** Composable Type System Specification using Heterogeneous Scope Graphs

Computer Science (specializations: Language Engineering and Software Engineering).

LANGUAGE SKILLS

Mother tongue(s): Dutch

Other language(s):

English

LISTENING C2 **READING** C2 **WRITING** C2

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

German

LISTENING B1 **READING** B1 **WRITING** B1

SPOKEN PRODUCTION B1 **SPOKEN INTERACTION** B1

PUBLICATIONS

[2022] **Incremental Type-Checking for Free: Using Scope Graphs to Derive Incremental Type-Checkers**

This paper presents a framework/API for incremental type checkers.

[2022] **Specializing Scope Graph Resolution Queries**

In this paper, we apply *partial evaluation* to improve the performance of name resolution queries in scope graphs.

[2023] **Scope Graphs: The Story so Far**

This paper presents an overview of the developments in the scope graph framework.

[2023] **A Monadic Framework for Name Resolution in Multi-phased Type Checkers**

In this paper, we develop an alternative method to implement type checkers using scope graphs, and compare it to the constraint-based approach applied in Statix.

[2024] **Defining Name Accessibility using Scope Graphs**

In this publication, we use scope graphs to provide a high-level specification of the semantics of access modifiers.

[2025] **Language-Parametric Reference Synthesis (under submission)**

In this work, we present a framework that uses Statix specifications to generate references that refer to a particular declaration. This can be used to prevent program transformations from resulting in ill-bound programs, and programs in which names were captured.