

SPLC Most Influential Paper (MIP) Award Committee

Dear Committee Members:

It is our pleasure to nominate Christian Prehofer's paper on "Feature-oriented programming: A new way of object composition" for the SPLC Most Influential Paper Award. A preliminary conference version of this paper appeared under the title "Feature-Oriented Programming: A Fresh Look at Objects" at ECOOP 1997; the revised journal version appeared in *Concurrency and Computation: Practice and Experience* in 2001.

From the perspective of nearly 20 years since its publication, we view this paper as a fundamental contribution to feature-oriented software development in particular, and software-product line engineering in general.

The key idea of this paper is first-class language support for features and feature interactions. Features represent software modules that can be composed with much greater flexibility than classes in object-oriented programming. When features are composed, coordinating their interactions may require additional code. In addition to a first-class abstraction of features, the paper also introduced the idea of lifters, which encapsulate the code needed to coordinate the interactions between two features. This paper was the first to propose a language design with first-class abstractions for features and feature interactions. It realized and demonstrated the design as an extension of a mainstream programming language, namely Java, and showed how the new concepts can be mapped to existing object-oriented composition mechanisms, such as inheritance and aggregation. Finally, the paper also identified the need to address feature interactions among more than two features, and proposed a solution within the lifter framework.

The paper was a harbinger of a large body of work on feature-oriented software development that followed, and specifically language support for this paradigm, and had important influence on that work. As an example of its immediate impact, the first of the undersigned supporters attended Christian Prehofer's presentation "From Inheritance to Feature Interactions" at an ECOOP workshop in Linz, Austria, in 1996, which described an early version of the feature-oriented programming concept. The idea of language abstractions for features and feature coordination influenced and stimulated the subsequent work on representing features using templates in C++, as described in Czarnecki and Eisenecker's paper "Synthesizing Objects" (ECOOP 1999); that work later evolved into the book on *Generative Programming* (2000). Another example of impact is Jia Liu, Don Batory, and Christian Lengauer's paper "Feature Oriented Refactoring of Legacy Applications" (ICSE 2006), which presented a theory of features, their implementing modules, and feature interactions. In particular, the theory related feature interactions to partial derivatives of functions, which provided an elegant model for decomposing multi-

feature interactions. The ICSE 2006 paper explicitly acknowledged the influence of Christian Prehofer's work, citing the idea of lifters as an inspiration for the theory.

The nominated paper has paved the way for entire research area on language design to support feature-oriented programming and modeling. Consequently, we consider this paper as seminal work in feature-oriented software development and software product lines. For these reasons, we support nominating this paper for the SPLC MIP in strongest possible terms.

Sincerely,

Krzysztof Czarnecki (University of Waterloo)

Sven Apel (University of Passau)

Joanne Atlee (University of Waterloo)

Marsha Chechik (University of Toronto)

Ulrich Eisenecker (University of Leipzig)

Christian Kästner (Carnegie Mellon University)

Ina Schäfer (Technical University of Braunschweig)

Norbert Siegmund (Bauhaus University Weimar)

Andrzej Wasowski (IT University of Copenhagen)