

# **2020 IEEE 14th International Workshop on Software Clones (IWSC 2020)**

**London, Ontario, Canada  
18 February 2020**



**IEEE Catalog Number: CFP2094S-POD  
ISBN: 978-1-7281-6270-6**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP2094S-POD
ISBN (Print-On-Demand):	978-1-7281-6270-6
ISBN (Online):	978-1-7281-6269-0
ISSN:	2329-0595

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Contents

## Frontmatter

Message from the Chairs . . . . .	iii
-----------------------------------	-----

## Clone Detection and Application

<b>Twin-Finder: Integrated Reasoning Engine for Pointer-Related Code Clone Detection</b> Hongfa Xue, Yongsheng Mei, Kailash Gogineni, Guru Venkataramani, and Tian Lan — <i>George Washington University, USA</i> . . . . .	1
<b>Improving Syntactical Clone Detection Methods through the Use of an Intermediate Representation</b> Pedro M. Caldeira, Kazunori Sakamoto, Hironori Washizaki, Yoshiaki Fukazawa, and Takahisa Shimada — <i>ETH Zurich, Switzerland; Waseda University, Japan; GAI0 TECHNOLOGY, Japan</i> . . . . .	8
<b>Evaluating Performance of Clone Detection Tools in Detecting Cloned Cochange Candidates</b> Md Nadim, Manishankar Mondal, and Chanchal K. Roy — <i>University of Saskatchewan, Canada</i> . . . . .	15
<b>Blanker: A Refactor-Oriented Cloned Source Code Normalizer</b> Davide Pizzolotto and Katsuro Inoue — <i>Osaka University, Japan</i> . . . . .	22
<b>CPPCD: A Token-Based Approach to Detecting Potential Clones</b> Yu-Liang Hung and Shingo Takada — <i>Keio University, Japan</i> . . . . .	26

## Clone Analysis

<b>An Empirical Study on Accidental Cross-Project Code Clones</b> Mitchel Pyl, Brent van Bladel, and Serge Demeyer — <i>University of Antwerp, Belgium</i> . . . . .	33
<b>Clone Detection on Large Scala Codebases</b> Wahidur Rahman, Yisen Xu, Fan Pu, Jifeng Xuan, Xiangyang Jia, Michail Basios, Leslie Kanthan, Lingbo Li, Fan Wu, and Baowen Xu — <i>Imperial College London, UK; Wuhan University, China; Turing Intelligence Technology, UK; Nanjing University, China</i> . . . . .	38
<b>Comparison and Visualization of Code Clone Detection Results</b> Kazuki Matsushima and Katsuro Inoue — <i>Osaka University, Japan</i> . . . . .	45
<b>Clone Swarm: A Cloud Based Code-Clone Analysis Tool</b> Venkat Bandi, Chanchal K. Roy, and Carl Gutwin — <i>University of Saskatchewan, Canada</i> . . . . .	52

## Semantic Clone Detection

<b>SemanticCloneBench: A Semantic Code Clone Benchmark using Crowd-Source Knowledge</b> Farouq Al-omari, Chanchal K. Roy, and Tonghao Chen — <i>University of Saskatchewan, Canada</i> . . . . .	57
<b>Towards Semantic Clone Detection via Probabilistic Software Modeling</b> Hannes Thaller, Lukas Linsbauer, and Alexander Egyed — <i>JKU Linz, Austria</i> . . . . .	64

Author Index . . . . .	70
------------------------	----