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Chiara Bodei · Gian-Luigi Ferrari
Corrado Priami (Eds.)

Programming Languages with Applications to Biology and Security

Essays Dedicated to Pierpaolo Degano
on the Occasion of His 65th Birthday



Springer

Editors

Chiara Bodei
Dipartimento di Informatica
Università di Pisa
Pisa
Italy

Corrado Priami
Dipartimento di Matematica
Università degli Studi di Trento
Povo
Italy

Gian-Luigi Ferrari
Dipartimento di Informatica
Università di Pisa
Pisa
Italy

Cover illustration: “Mondrianized Blackboard” created by Chiara Bodei.
Photograph on p. V: The photograph of the honoree was taken by Massimo Bartoletti.

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-25526-2 ISBN 978-3-319-25527-9 (eBook)
DOI 10.1007/978-3-319-25527-9

Library of Congress Control Number: 2015952034

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

Springer Cham Heidelberg New York Dordrecht London
© Springer International Publishing Switzerland 2015

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Printed on acid-free paper

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$$\begin{array}{c}
 (\text{T-App}) \quad \frac{\phi \vdash e : \tau \quad \sigma \vdash e' : \tau'}{\phi \vdash e e' : \tau \sigma} \quad \text{H} \cdot \text{H}' \cdot \text{H}'' \\
 \mu\beta \quad \frac{\phi \vdash e : \tau \quad \sigma \vdash e' : \tau'}{\phi \vdash e : \tau} \quad \text{H} \cdot \text{H}' \cdot \text{H}'' \quad \Lambda(\text{H} \cdot \text{H}' \cdot \text{H}'') \\
 / 2006
 \end{array}$$

$$\begin{array}{c}
 (\text{T-App} + \text{E-AppL}) \quad \frac{n_0, \Gamma_0, e \rightarrow n_1, \Gamma_1, e''}{n_0, \Gamma_0, e e' \rightarrow n_1, \Gamma_1, e'' e'} \quad \boxed{\begin{array}{l} \text{H(OH)} = \sqrt{\text{v}_n \text{H}} \text{O} \text{H} \\ \{ \text{H} \cdot \text{H}' \cdot \text{H}'' \} \\ \text{(A) } \text{H} \approx \text{m} \# \text{H} \in \text{H} \\ \text{(B) } \text{m}(\text{H}) \text{ m}(\text{H}') \end{array}}
 \end{array}$$

$$\begin{aligned}
 & - n_0 [\Lambda(\text{H} \cdot \text{H}' \cdot \text{H}'')] = n_0 [\Lambda(\text{H} \cdot \text{H}' \cdot \text{H}'')] \\
 & = n_0 [\Lambda(\text{H} \cdot \text{H}' \cdot \Lambda(\text{H}' \cdot \text{H}''))] \\
 & \text{Skull} = \nabla_{n_0} n_0 [\Lambda(\text{H} \cdot \text{H}' \cdot \Lambda(\text{H}' \cdot \text{H}''))]
 \end{aligned}$$

Pierpaolo Degano, after 117 pages of proofs

Preface

This Festschrift volume mainly contains 22 refereed research papers and one extended abstract by close collaborators and friends of Pierpaolo Degano to celebrate him on the occasion of his 65th birthday.

The foreword of this volume includes a *laudatio* illustrating the distinguished career and the main scientific contributions by Pierpaolo and a portrait of him made by one of his closest friends. The following sections are dedicated to the scientific papers on the main research topics explored by Pierpaolo and still under his investigation.

Pierpaolo has worked on a large variety of topics including formal program semantics, concurrency theory, systems biology and security, and much more.

Each contribution was carefully reviewed by one or two readers. The editors would like to thank the several anonymous individuals for their assistance.

A preliminary version of this volume has been presented to Pierpaolo on June 19, 2015, during a one-day colloquium held in Pisa at the Department of Computer Science.

Five eminent scientists and also friends of Pierpaolo gave their invited talk on that occasion. We thank Ugo Montanari, Martín Abadi, Luca Cardelli, Joshua Guttman, and Flemming Nielson for having accepted our invitation. Their contributions can be found after the *laudatio* and the portrait of Pierpaolo.

We also would like to thank the Department of Computer Science and the University of Pisa for their logistic support in the organization of the Colloquium.

With this book we want to celebrate Pierpaolo's vision, beside his achievements, and also to witness the great esteem and favor he has in the academic community.

August 2015

Chiara Bodei
Gian-Luigi Ferrari
Corrado Priami

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