## Lecture Notes in Computer Science

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

## Editorial Board

David Hutchison
Lancaster University, UK
Takeo Kanade
Carnegie Mellon University, Pittsburgh, PA, USA
Josef Kittler
University of Surrey, Guildford, UK
Jon M. Kleinberg
Cornell University, Ithaca, NY, USA
Alfred Kobsa
University of California, Irvine, CA, USA
Friedemann Mattern
ETH Zurich, Switzerland
John C. Mitchell
Stanford University, CA, USA
Moni Naor
Weizmann Institute of Science, Rehovot, Israel
Oscar Nierstrasz
University of Bern, Switzerland
C. Pandu Rangan

Indian Institute of Technology, Madras, India
Bernhard Steffen
TU Dortmund University, Germany
Madhu Sudan
Microsoft Research, Cambridge, MA, USA
Demetri Terzopoulos
University of California, Los Angeles, CA, USA
Doug Tygar
University of California, Berkeley, CA, USA
Gerhard Weikum
Max Planck Institute for Informatics, Saarbruecken, Germany

Ken Peffers Marcus Rothenberger Bill Kuechler (Eds.)

# Design Science Research in Information Systems 

Advances in Theory and Practice

7th International Conference, DESRIST 2012
Las Vegas, NV, USA, May 14-15, 2012 Proceedings

Volume Editors

Ken Peffers<br>Marcus Rothenberger<br>University of Nevada Las Vegas, Lee Business School<br>4505 S. Maryland Pkwy, Las Vegas, NV 89514, USA<br>E-mail: k@peffers.com, marcus.rothenberger@unlv.edu

Bill Kuechler<br>University of Nevada Reno, Information Systems /026<br>1664 N. Virginia Street, Reno, NV 89557-0208, USA<br>E-mail: kuechler@unr.edu

ISSN 0302-9743 e-ISSN 1611-3349
ISBN 978-3-642-29862-2 e-ISBN 978-3-642-29863-9
DOI 10.1007/978-3-642-29863-9
Springer Heidelberg Dordrecht London New York
Library of Congress Control Number: 2012936047
CR Subject Classification (1998): H.4, H.5, I.2, H.3, D.2, C. 2
LNCS Sublibrary: SL 3 - Information Systems and Application, incl. Internet/Web and HCI

[^0]
## Preface

The growing interest in design science research in information systems continues unabated in 2012. Scholars and design practitioners from many areas such as information systems, computer science, medical informatics, and software engineering are drawn to this area for its ability to extend the boundaries of human and organizational capabilities. The outputs of DESRIST, new and innovative constructs, models, methods, processes, and systems provide the basis for novel solutions to design problems in many fields.

The seventh DESRIST conference, DESRIST 2012, held in Las Vegas built on the tradition and foundation of six prior highly successful international conferences held in Claremont, Pasadena, Atlanta, Philadelphia, St. Gallen, and Milwaukee.

The title of this volume, Design Science Research in Information Systems: Advances in Theory and Practice, reflects the breadth of the field, the continuing interest in DESRIST theory formulation and development, and the degree to which this highly practical form of research is influencing design practice in business and government. The subheadings of the table of contents for the proceedings reflect the extent of design science research and its applications: Theory and Theory Building ( $13 \%$ of submissions), DSRIS Methodologies and Techniques (6.5\%), Social and Environmental Aspects of DSRIS (19\%), DSRIS in Practice ( $45 \%$ ), and Evaluation of DSRIS projects ( $16 \%$ ). This year a substantial majority of the papers described the application of design science research to real-world design problems in both industry and government. This was an interesting shift that complemented the proceedings of the previous DESRIST conferences in which theory and theoretical papers dominated.

Forty-four papers were submitted to the conference for review. Each paper was reviewed by at least two referees. The reviews were double blind, meaning that each of the two groups - authors and referees - remained anonymous to one another. Twenty-four papers were accepted as full length research papers and seven papers as short papers.

We thank the authors who submitted papers to DESRIST 2012, and trust the readers will find the papers as interesting and informative as we did. We would like to thank the members of the Program Committee as well as the additional referees, who took the time to provide detailed and constructive reviews to the authors. We would also like to thank the other members of the Organizing

Committee, as well as the volunteers, whose dedication and effort helped bring about another successful conference. We believe the papers in the DESRIST 2012 proceedings provide several interesting and valuable insights into the theory and practice of design science, and they open up new and exciting possibilities for research in the discipline.

May 2012
Ken Peffers
Marcus Rothenberger
Bill Kuechler

## Organization

DESRIST 2012 was organized by the Lee School of Business, University of Nevada, Las Vegas

## General Chairs

Hemant Jain
Atish Sinha

## Program Chairs

Ken Peffers

Marcus Rothenberger
University of Nevada Las Vegas, USA
University of Nevada Las Vegas, USA

## Proceedings Chair

Bill Kuechler
University of Nevada, Reno, USA

## Doctoral

Samir Chatterjee
Claremont Graduate University, USA

Consortium Chair
Henk Sol
University of Groningen, The Netherlands

Communications Chair
Michael Lee

Program Committee
Ahmed Abbasi
Stephan Aier
Richard Baskerville
Udo Bub
Tobias Bucher
Sven Carlsson
Roger Chiang
Chen-Huei Chou
Ulrich Frank

University of Wisconsin - Milwaukee, USA
University of Wisconsin - Milwaukee, USA

Mike Goul
Shirley Gregor
Alan Hevner
Lakshmi Iyer
Joakim Lilliesköld
Björn Niehaves
Volker Nissen
Andreas Oberweis
Jinsoo Park
Jeffrey Parsons
Stacie Petter
Jan Pries-Heje
Erik Proper

Sandeep Purao
Sudha Ram
Matti Rossi
Michael Schermann
Arun Sen
Henk Sol
Mark Srite
Kevin Sullivan
Tuure Tuunanen
Vijay Vaishnavi
John Venable
Ramesh Venkataraman
Jan Verelst
Jan vom Brocke
Joseph Walls
George Widmeyer
Roel Wieringa
George Wyner
Huimin Zhao
Jack Zheng

Arizona State University, USA
Australian National University, Australia
University of South Florida, USA
University of North Carolina at Greensboro, USA
KTH Royal Institute of Technology, Sweden
University of Münster, Germany
Ilmenau University of Technology, Germany
University of Karlsruhe, Germany
Seoul National University, South Korea
Memorial University of Newfoundland, Canada
University of Nebraska at Omaha, USA
Roskilde Universiy, Denmark
Radboud University Nijmegen, The Netherlands
Penn State University, USA
University of Arizona, USA
University of Helsinki, Finland
Technical University of Munich, Germany
Texas A \& M University, USA
University of Groningen, The Netherlands
University of Wisconsin - Milwaukee, USA
University of Virginia
University of Oulu, Finland
Georgia State University, USA
Curtin University, Australia
Indiana University, USA
University of Antwerp, Belgium
University of Liechtenstein, Liechtenstein
University of Michigan, USA
New Jersey Institute of Technology, USA
University of Twente, The Netherlands
Boston University, USA
University of Wisconsin-Milwaukee, USA
Southern Polytechnic State University, USA

## Conference Sponsors

University of Nevada, Las Vegas, Lee School of Business
University of Wisconsin, Milwaukee, Sheldon B. Lubar School of Business University of St. Gallen

## Table of Contents

DSRIS in Practice
Towards a Comprehensive Online Peer Assessment System: Design Outlines ..... 1
Dmytro Babik, Lakshmi S. Iyer, and Eric W. Ford
Designing Digital Innovation Contests ..... 9
Anders Hjalmarsson and Daniel Rudmark
Evaluating APIs: A Call for Design Science Research ..... 28
Bala Iyer and George Wyner
Designing for Recombination: Process Design through Template Combination ..... 36
Arvind Karunakaran and Sandeep Purao
Design Principles for Inter-Organizational Systems Development - Case Hansel ..... 52
Heikki Lempinen, Matti Rossi, and Virpi Kristiina Tuunainen
Using Design Science Research to Develop a Modeling Technique for Service Design ..... 66
Lysanne Lessard and Eric Yu
Towards a Decision Tool for Choosing a Business Process Maturity Model ..... 78
Amy Van Looy, Manu De Backer, and Geert Poels
Implementing Design Principles for Collaborative ERP Systems ..... 88
Wendy Lucas and Tamara Babaian
Applying Design Science Research for Enterprise Architecture Business Value Assessments ..... 108
Martin Meyer, Markus Helfert, Brian Donnellan, and Jim Kenneally
Designing-in-the-Large: Combining Local Perspectives to Generate Enterprise-Wide Integration Solutions ..... 122
Sandeep Purao, Narasimha Bolloju, and Chuan Hoo Tan
Emergency Response System Design: An Examination of Emergency Communication Messages ..... 139
Rohit Valecha, Raj Sharman, Raghav Rao, and Shambhu Upadhyaya
An Approach for Smart Artifacts for Mobile Advertising ..... 147
Upkar Varshney
Towards a Unified Design Theory for Creativity Support Systems ..... 152
Matthias Voigt, Björn Niehaves, and Jörg Becker
What Makes Corporate Wikis Work? Wiki Affordances and Their Suitability for Corporate Knowledge Work ..... 174
M. Lisa Yeo and Ofer Arazy
DSRIS Methodologies and Techniques
Design Science as Design of Social Systems - Implications for Information Systems Research ..... 191
Andreas Drechsler
Towards Design Engineering of Ubiquitous Information Systems ..... 206
Wolfgang Maass and Sabine Janzen
Technical Action Research as a Validation Method in Information Systems Design Science ..... 220
Roel Wieringa and Ayşe Moralı
Social and Environmental Aspects of DSRIS
Decision Enhancement for Sourcing with Shared Service Centres in the Dutch Government ..... 239
Arjan Knol, Henk Sol, and Johan van Wamelen
Designing a Framework for Virtual Management and Team Building. ..... 256
Jan Pries-Heje and Lene Pries-Heje
Integrating Organisational Design with IT Design: The Queensland Health Payroll Case ..... 271
António Rito Silva and Michael Rosemann
Common Citation Analysis and Technology Overlap Factor:
An Empirical Investigation of Litigated Patents Using Network Analysis ..... 287
Srikar Velichety and Sudha Ram
Environmental Sustainability in Design Science Research: Direct and Indirect Effects of Design Artifacts ..... 294
Jan vom Brocke and Stefan Seidel
Theory and Theory Building in DSRIS
Design Science Research and the Core of Information Systems ..... 309
Ahmad Alturki, Wasana Bandara, and Guy G. Gable
Anatomy of Knowledge Bases Used in Design Science Research: A Literature Review ..... 328
Oliver Gaß, Norbert Koppenhagen, Harald Biegel, Alexander Maedche, and Benjamin Müller
Characterizing Design Science Theories by Level of Constraint on Design Decisions ..... 345
Bill Kuechler and Vijay Vaishnavi
On the Relationship between the IT Artifact and Design Theory: The Case of Virtual Social Facilitation ..... 354
Björn Niehaves, Kevin Ortbach, and Asin Tavakoli
Towards a Formal Approach to Information Systems Design Theory Using Category Theory ..... 371
George R. Widmeyer
Evaluation of DSRIS projects
Evaluations in the Science of the Artificial - Reconsidering the Build-Evaluate Pattern in Design Science Research ..... 381
Christian Sonnenberg and Jan vom Brocke
Design Science Research Evaluation ..... 398
Ken Peffers, Marcus Rothenberger, Tuure Tuunanen, and Reza Vaezi
Design of Software Agent-Populated Electronic Negotiation System and Evaluation of Human - to - Agent Negotiations ..... 411
Rustam Vahidov and Gregory E. Kersten
A Comprehensive Framework for Evaluation in Design Science Research ..... 423
John Venable, Jan Pries-Heje, and Richard Baskerville
Author Index ..... 439


[^0]:    © Springer-Verlag Berlin Heidelberg 2012
    This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.
    The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

    Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
    Printed on acid-free paper
    Springer is part of Springer Science+Business Media (www.springer.com)

