Table of Contents

ITiCSE 2012 Conference Organization .............................................................. xii
ITiCSE 2012 Working Groups ............................................................................ xiii
ITiCSE 2012 Sponsors & Supporters ................................................................. xiv
ITiCSE 2012 Reviewers ..................................................................................... xv

Keynote Addresses
- Never Too Early to Begin: Computer Science for High-School Students .......... 1
  Michael Rabin (Hebrew University & Harvard University)
- Alan Turing and the Other Theory of Computation .................................... 2
  Lenore Blum (Carnegie Mellon University)
- Standing on the Shoulders of a Giant: One Person’s Experience of Turing’s Impact ........ 3
  David Harel (The Weizmann Institute of Science)

Session 1: Active Learning
- Activities, Affordances and Attitude — How Student-generated Questions Assist Learning ........ 4
  Andrew Luxton-Reilly, Paul Denny, Beryl Plimmer, Robert Sheehan (The University of Auckland)
- Maximizing Learning and Guiding Behavior in Free Play User Generated Content Environments ................................................................. 10
  Acey Boyce, Antoine Campbell, Shaun Pickford, Dustin Culler, Tiffany Barnes (University of North Carolina at Charlotte)
- Lectures Abandoned: Active Learning by Active Seminars .......................... 16
  Henrik Bærbæk Christensen, Aino Corry (Aarhus University)

Session 2: K-12
- Infusing Computational Thinking into the Middle- and High-School Curriculum .......... 22
  Amber Settle (DePaul University), Baker Franke, Ruth Hansen, Frances Spaltro, Cynthia Jurisson, Colin Rembert-May, Brian Wildeman (The University of Chicago Laboratory Schools)
- Pseudo Abstract Composition: The Case of Language Concatenation .......... 28
  Ronnie Alankry, David Ginat (Tel-Aviv University)
- Teaching Graph Algorithms to Children of All Ages .................................. 34
  J. Paul Gibson (Telecom Sud Paris)

Session 3: Algorithms
- Forming Project Groups While Learning about Matching and Network Flows in Algorithms ................................................................. 40
  Dinesh Mehta, Tina Kouri, Irene Polycarpou (Colorado School of Mines)
- Refinement of an Experimental Approach to Computer-Based, Active Learning of Greedy Algorithms ................................................................. 46
  J. Angel Velázquez-Hurbide (Universidad Rey Juan Carlos)
- Digging for Algorithmic Nuggets in the Land of Polyominoes .................. 52
  Anany Levitin (Villanova University)
Session 4: Systems

- The Empirically Refined Competence Structure Model for Embedded Micro- and Nanosystems
  Andre Schäfer, Rainer Brück, Steffen Büchner, Steffen Jaschke, Sigrid Schubert (University of Siegen), Dietmar Fey, Bruno Kleinert, Harald Schmidt (University of Erlangen-Nürnberg)

- Supporting Operating Systems Projects using the µMPS2 Hardware Simulator
  Michael Goldweber (Xavier University), Renzo Davoli, Tomislav Jonjic (Università di Bologna)

- Integrating Data-Intensive Cloud Computing with Multicores and Clusters in an HPC Course
  Atanas Radenski (Chapman University)

Session 5: CS1/2 I

- All Syntax Errors Are Not Equal
  Paul Denny, Andrew Luxton-Reilly, Ewan Tempero (The University of Auckland)

- Code Comprehension Problems as Learning Events
  Leigh Ann Sudol, Mark Stehlik, Sharon Carver (Carnegie Mellon University)

- An Open-Ended Environment for Teaching Java in Context
  André L. Santos (University of Lisbon & ISCTE-IUL)

Session 6: Testing

- On Teaching Arrays with Test-Driven Learning in WebIDE
  Michael Hilton, David S. Janzen (California Polytechnic State University)

- JUG: A JUnit Generation, Time Complexity Analysis and Reporting Tool to Streamline Grading
  Christopher Brown, Robert Pastel, John Earnest (Michigan Technological University), Bill Siever (Northwest Missouri State University)

- Exploring Influences on Student Adherence to Test-Driven Development
  Kevin Buffardi, Stephen H. Edwards (Virginia Tech)

Session 7: Assessment I

- Statistical Evidence of the Correlation between Mental Ability to Compute and Student Performance in Undergraduate Courses
  Osvaldo Luiz de Oliveira (Campo Limpo Paulista)

- Grade Inflation, What Students Value, and the Necessity of Suffering
  Taly Sharon, Paul Kingsley (University of Liverpool)

- Instructor-Centric Source Code Plagiarism Detection and Plagiarism Corpus
  Jonathan Y. H. Poon, Kazunari Sugiyama (National University of Singapore), Yee Fan Tan (KAI Square), Min-Yen Kan (National University of Singapore)

Session 8: CS1/2 II

- Enriching Introductory Programming Courses with Non-Intuitive Probability Experiments Component
  Yana Kortsarts (Widener University), Yulia Kempter (Holon Institute of Technology)

- A Study on Students’ Behaviours and Attitudes towards Learning to Program
  Anabela Gomes, Altarve Santos (University of Coimbra & Engineering Institute of Coimbra), António José Mendes (University of Coimbra)

- Initial Results of Using an Intelligent Tutoring System with Alice
  Stephen Cooper, Yoon Jae Nam (Stanford University), Luo Si (Purdue University)
Session 9: Technologies in CSE

- Student Reactions to Classroom Lecture Capture ........................................... 144
  Paul E. Dickson, David I. Warshow, Alec C. Goebel, Colin C. Roache (Hampshire College),
  W. Richards Adrion (University of Massachusetts, Amherst)

- Beyond PDF and ePub: Toward an Interactive Textbook .................................. 150
  Brad Miller, David L. Ranum (Luther College)

- The Future of Teaching Programming is on Mobile Devices ............................ 156
  Nikolai Tillmann, Michal Moskal, Jonathan de Halleux, Manuel Fahndrich, Judith Bishop, Arjmand Samuel
  (Microsoft Research), Tao Xie (North Carolina State University)

Session 10: Assessment II

- Evaluation of a Collaborative Instructional Framework for Programming Learning ...... 162
  Luis Miguel Serrano-Cámara, Maximiliano Paredes Velasco, J. Ángel Velázquez-Iturbide
  (Universidad Rey Juan Carlos)

- Capstone Project: Fair, Just and Accountable Assessment ................................ 168
  Vivienne Farrell, Gilbert Ravalli, Graham Farrell, Paul Kindler, David Hall (Swinburne University)

- Comparing the Effectiveness of Different Educational Uses of Program Animations ..... 174
  Jaime Urquiza-Fuentes, J. Ángel Velázquez-Iturbide (Universidad Rey Juan Carlos)

Session 11: Classroom Management

- Pros and Cons for Teaching Courses in the Classroom and Online Simultaneously ...... 180
  J. Mark Pullen (George Mason University)

- SpecCheck: Automated Generation of Tests for Interface Conformance .................. 186
  Chris Johnson (University of Wisconsin, Eau Claire)

- PETCHA - A Programming Exercises Teaching Assistant ............................... 192
  Ricardo Queirós (CRACS & INESC-Porto LA & DI-ESEIG/IPP),
  José Paulo Leal (CRACS & INESC-Porto LA & University of Porto)

Session 12: K-12 II

- Spaghetti for the Main Course? Observations on the Naturalness of Scenario-Based Programming ........................................... 198
  Michal Gordon, Assaf Marron, Orni Meerbaum-Salant (Weizmann Institute of Science)

- A New Curriculum for Junior-High in Computer Science .................................... 204
  Iris Zur Bargury (The Ministry of Education, Israel & Babeş-Bolyai University)

- Outreach for Improved Student Performance: A Game Design and Development Curriculum ........................................... 209
  Kaelyn Doran, Acey Boyce, Samantha Finkelstein, Tiffany Barnes (University of North Carolina at Charlotte)

Session 13: Short Presentations I

- CS1001.py: A Topic-Based Introduction to Computer Science ............................ 215
  Benny Chor, Rani Hod (Tel-Aviv University)

- Withdrawn by chairs ......................................................................................... 221

  Khuleed Asad, Moshe Bank (Ben-Gurion University of the Negev)

  Carlos García, Fernando Castro, Jose Ignacio Gomez, Christian Tenllado, Daniel Chaver, Jose A. Lopez-Orozco
  (Complutense University of Madrid)
• A Method to Construct Counterexamples for Greedy Algorithms ........................................ 238
  Jagadish M. Sridhar Iyer (Indian Institute of Technology Bombay)

• Integrating AI and Machine Learning in Software Engineering Course for High School Students ........................................ 244
  Ahuva Sperling, Dorit Lieberman (Leo Baeck Education Center)

Session 14: Pedagogical Tools

• An Interactive Functional Programming Tutor ........................................ 250
  Alex Gerdes (Open Universiteit Nederland), Johan Jeuring (Utrecht University), Bastiaan Heeren (Open Universiteit Nederland)

• V-Lab: A Cloud-Based Virtual Laboratory Platform for Hands-On Networking Courses ........................................ 256
  Le Xu, Dijiang Huang, Wei-Tek Tsai (Arizona State University)

• Serious Toys: Teaching the Binary Number System ........................................ 262
  Yvon Feustel (Clemson University), Fathn Ali (Lander University), Jason O. Hallstrom (Clemson University)

Session 15: Computers and Society

• Bio1 as CS1: Evaluating a Crossdisciplinary CS Context ........................................ 268
  Zachary Dodds, Ron Libeskind-Hadas, Eliot Bush (Harvey Mudd College)

• A Study of Stereotype Threat in Computer Science ........................................ 273
  Anmuth N. Kumar (Ramapo College of New Jersey)

• What Do Computer Scientists Do? A Survey of CS and Non-CS Liberal Arts Faculty ........................................ 279
  Hannah Fidolen, Jaime Spacco (Knox College)

Session 16: Short Presentations II

• Novices' Perceptions and Experiences of a Mobile Social Learning Environment for Learning of Programming ........................................ 285
  Mercy Maleko, Margaret Hamilton, Daryl D'Souza (RMIT University)

• Choosing a Study Mode in Blended Learning ........................................ 291
  Mikko Myllymäki, Ismo Hakala (University of Jyväskylä & Kokkola University)

• cs4fn: A Flexible Model for Computer Science Outreach ........................................ 297
  Chrystie Mykeltiak, Paul Curzon, Jonathan Black, Peter W. McOwan (Queen Mary University of London), Laura R. Meagher (UK Technology Development Group)

• Anatomy, Dissection, and Mechanics of an Introductory Cyber-Security Course's Curriculum at the United States Naval Academy ........................................ 303
  Christopher Brown, Frederick Crabbe, Rith Doer, Raymond Greenlaw, Chris Hoffmeister, Justin Monroe, Donald Needham, Andrew Phillips, Anthony Pollman, Stephen Schall, John Schultz, Steven Simon, David Stahl, Sarah Stadnuck (United States Naval Academy)

• Fuzzy OOP: Expanded and Reduced Term Interpretations ........................................ 309
  Rosit Simallo (Tel-Aviv University), Noa Ragonis (Beit Berl College & Technion), David Ginat (Tel-Aviv University)

• Formal Learning Groups in an Introductory CS Course: A Qualitative Exploration ........................................ 315
  Julie Krause, Irene Polyannou, Cyndi Rader (Colorado School of Mines)

Session 17: Interface-Related Tools

• Competitive Evaluation in a Video Game Development Course ........................................ 321
  Manuel Palomo-Duarte, Juan Manuel Dodero, José Tomás Tocino, Antonio García-Domínguez, Antonio Balderas (University of Cádiz)
User Interface Evaluation by Novices ................................................................. 327
Dennis Bouvier (Southern Illinois University, Edwardsville), Tzu-Yi Chen (Pomona College),
Gary Lewandowski (Xavier University), Robert McCartney (University of Connecticut),
Kate Sanders (Rhode Island College), Tammy VanDeGrift (University of Portland)

MyTuringTable: A Teaching Tool to Accompany Turing's Original Paper
on Computability ........................................................................................................... 333
Barry Fagin, Dino Schweitzer (US Air Force Academy)

Session 18: Curriculum Issues

Integrating the Teaching of Algorithmic Patterns into Computer Science Teacher
Preparation Programs .................................................................................................. 339
Noa Ragonis (Beit Berl College & Technion)

μPython: Non-Majors Programming from the Very First Lecture ......................... 345
John Aycock (University of Calgary)

Engaging Computer Science in Traditional Education: The ECSITE Project .......... 351
Debra S. Goldberg, Dirk Grumwald, Clayton Lewis, Jessica A. Feld, Sarah Hug (University of Colorado Boulder)

A Systematic Approach to Teaching Abstraction and Mathematical Modeling .......... 357
Charles T. Cook, Svetlana Drachova, Jason O. Hallstrom (Clemson University),
Joseph Hollingsworth (Indiana University Southeast), David P. Jacobs (Clemson University),
Joan Krone (Denison University), Murali Sitaraman (Clemson University)

Panels

The New CSTA K–12 Computer Science Standards .............................................. 363
Steven Cooper (Stanford University), Barbara Boucher Owens (Southwestern University),
Chris Stephenson (Computer Science Teachers Association), Judith Gal-Ezer (Open University of Israel)

Computer Science as a Community Involvement Activity .................................... 365
Assaf Zaritsky, Ohad Barzilay (Tel Aviv University)

Assessing the Benefits of Integrating Social Issues Components
in the Computing Curriculum ...................................................................................... 367
Paul M. Leidig (Grand Valley State University), Michael Goldweber (Xavier University),
Barbara Boucher Owens (Southwestern University)

Tips, Techniques and Courseware I

Programming Studio: Advances and Lessons Learned ........................................... 369
Charlie Meyer, Michael Woodley (University of Illinois at Urbana-Champaign)

Sample Courseware for Introductory OO Programming ........................................ 370
Rikki Fletcher, Rocio Guillen (California State University, San Marcos)

A Web-Based Problem Solving Tool for Introductory Computer Science .............. 371
Petr Jarušek, Radek Pelanek (Botanická 68a, Czech Republic)

Techniques at the Intersection of Computing and Music .......................................... 372
Jesse M. Heines, Gena R. Greher, S. Alex Ruthmann (University of Massachusetts, Lowell)

Nintendo® DS Projects to Learn Computer Input-Output ....................................... 373
Edume Larraga-Mendiluze, Nestor Garay-Vitoria, Jose Ignacio Martin, Javier Muguerza,
Iraxto Soraluze, Jose Francisco Lukas, Karlos Santiago (University of the Basque Country)

Using Professional and Ethical Themes .................................................................... 374
John Impagliazzo (Hofstra University)

Breadth First Search (Animation and Obstacle Avoidance) ..................................... 375
Arnold Rosenbloom (University of Toronto at Mississauga)

Tips, Techniques and Courseware II

Teaching Labs on Pseudorandom Number Generation ......................................... 376
Elizabeth Pattitsas (University of Toronto)

ix
• **Best Practices for Time-Management of Student Groups with Heterogeneous Effort** ........................................................................ 377
  André Schäfer, Matthias Mielke, Rainer Brück (University of Siegen)

• **Developing Contexts for Teaching Java Using AGUIA/J** ................................................................. 378
  André L. Santos (University of Lisbon & ISCTE-IUL)

• **The Presenter First Design Approach** ................................................................................................. 379
  Zachary Kunnas (Grand Valley State University)

• **A Hardware Simulator for Teaching CPU Design** ............................................................................ 380
  Michael Black (American University)

• **Introvert Educators: Techniques to be Effective in the Traditional Face-to-Face CS Classroom** .......... 381
  Karina Vaslita Assiter (Wentworth Institute of Technology)

### Posters

• **The Effect of Mathematical vs. Verbal Formulation for Finite Automata** ........................................ 382
  Tali Dror, Dafna Levi Rashti (Kiryat Sharet High School)

• **A Model of CS Teachers' Knowledge Growth** .................................................................................. 383
  Neomi Liberman, Yifat Ben-David Kolikant (The Hebrew University of Jerusalem), Catieel Beeri (Dan Academic Center, Israel)

• **Cryptography for the Million** ........................................................................................................... 384
  Yoannan Chon (Choredic College), Eran London (Hadassah Academic College), Moshe Munk (Choredic College)

• **The Scientific Method and Software Testing Integrated into the Same Lesson** .............................. 385
  Hanania T. Salzer (HP OMS), Bruria Haberman, Cecil Yehzkel (Weizmam Institute of Science)

• **An Animation as an Illustrate Tool for Learning Concepts in Oop** .................................................. 386
  Yael Mussrai, Neomi Liberman (Jerusalem College)

• **How Innovative Technology Tools Can Be Used to Create New Methodology for Teaching Knowledge** .................................................................................................................. 387
  Eti Hershkovitch (Maccabim-Reut Mir High School), Bruria Haberman (Holon Institute of Technology & Weizmann Institute of Science)

• **Mobile Game Development Projects in CS 1** .................................................................................. 388
  Stan Kurkovsky (Central Connecticut State University)

• **Applying Advanced Technology Tools in Distance Learning - Case Study: Traffic Data and Road Safety** ....................................................................................................................... 389
  Muna Baghdadi, Khaled Asad, Jamal Rajun (Alqasemi-Academic College of Education)

• **Junior High School Students Performing Image Smoothening and Noise Filtering by Applying Mathematical Operations** ........................................................................................................ 390
  Khaled Asad (Alqasemi Academic College of Education & Ben-Gurion University of the Negev)

• **Intuitive Thinking While Dealing with Abstract Data Types** ............................................................. 391
  Waleed Khalifa (Sakhnin College of Education)

• **Similarities in CSE and Gemara Education** ..................................................................................... 392
  Bracha Daum-Reiter (Yeshivat Hashomron), Shuki Galit (Levada High School)

• **Teachers’ Perception of Teaching Problem-Solving Strategies to Novices** ...................................... 393
  Lavy Bunimovich (Ort Michlala, Givat-Ram)

• **Withdrawn by chairs** ......................................................................................................................... 394

• **Are Students Learning Object Oriented Programming in an Object Oriented Programming Course? Student Voices** ........................................................................................................... 395
  Desmond Wesley Govender, Irene Govender (University of KwaZulu-Natal)

• **Problem Presentation in CS1 Courses** ............................................................................................. 396
  Carmen Morgado, Fernanda Barbosa (Universidade Nova de Lisboa)

• **A Learning Tool for MP3 Audio Compression** .................................................................................. 397
  Mohamed Hamada, Hyato Nanae (University of Aizu)
• A Qualitative Framework for Comparison and Evaluation of Computer Science Doctoral Programs ........................................................................................................398
  Maria del Carmen Calatrava Moreno (Vienna University of Technology)

• A Structured Approach to Problem Solving in CS1 ..........................................................................................................................399
  Carmen Morgado, Fernanda Barbosa (Universidade Nova de Lisboa)

• DSS for the Group Estimating of the Graduation Papers ........................................................................................................400
  Vsevolod Kuzmitskiy, Boris Davydov (Far Eastern State Transport University)

• Using Quick Response Codes for Student Interaction During Lectures ..................................................................................401
  Robert Law (Glasgow Caledonian University)

• Zawilinski: Helping Beginning Programmers Conduct MediaWiki-based Research ..........................................................402
  Zachary Kurmas (Grand Valley State University)

• Kielce: Configurable HTML Course Documents ......................................................................................................................403
  Zachary Kurmas (Grand Valley State University)

• Teaching Programming on a Mobile Device .................................................................................................................................404
  Nikolai Tillmann, Judith Bishop (Microsoft Research)

• Visual Search with Deep Zoom to Explore Curriculum Resources Interactively .................................................................405
  Arkady Retik (Microsoft Corporation)

Author Index ..................................................................................................................................................................................407