Table of Contents

Message from the Symposium and Program Chairs .......................................................... iii
Gary Lewandowski (Xavier University), Steven Wolfman (University of British Columbia),
Ellen L. Walker (Hiram College), Thomas J. Cortina (Carnegie Mellon University)

Message from the SIGCSE Chair .................................................................................. v
Barbara Boucher Owens (Southwestern University)

Recipients of the SIGCSE Award for Outstanding Contributions to Computer Science Education ................................................................. xviii

Recipients of the SIGCSE Lifetime Service Award ..................................................... xviii

SIGCSE 2010 Symposium Committee ......................................................................... xix

SIGCSE 2011 Call for Participation .............................................................................. xx

SIGCSE 2010 Board-Sponsored Pre-Symposium Events ........................................ xxii

Upcoming Events .......................................................................................................... xxii

SIGCSE 2010 Reviewers ............................................................................................... xxiii

Keynote Address
Session Chairs: Gary Lewandowski (Xavier University), Steven Wolfman (University of British Columbia)

- Useful Sharing ........................................................................................................... 1
  Sally Fincher (University of Kent)

Session 1: Compilers and Languages
Session Chair: Deborah Dunn (Stephen F. Austin State University)

- Building Server-Side Web Language Processors ..................................................... 2
  Ariel Ortiz (Tecnológico de Monterrey, Campus Estado de México)

- MieruCompiler: Integrated Visualization Tool with “Horizontal Slicing” for Educational Compilers .............................................................. 7
  Katsuhiko Gondow (Tokyo Institute of Technology), Naoki Fukuyasa (Wakayama University),
  Yoshitaka Arahori (Tokyo Institute of Technology)

- Frances: A Tool for Understanding Code Generation .......................................... 12
  Tyler Sondag (Iowa State University), Kian L. Pokorny (McKendree University),
  Hridesh Rajan (Iowa State University)

Session 2: Diversity
Session Chair: Tim Bell (University of Canterbury)

- Do Roadshows Work?: Examining the Effectiveness of Just Be ............................ 17
  Joseph A. Cottam, Samantha S. Foley, Suzanne Menzel (Indiana University)

- Connecting K-16 Curriculum & Policy: Making Computer Science Engaging,
  Accessible, and Hospitable for Underrepresented Students ................................ 22
  Joanna Goode (University of Oregon)

- Integrating Evaluation into Program Development: Benefits of Baselining a NSF-BPC Alliance ................................................................. 27
  W. Richards Adrion, Renee Fall (University of Massachusetts, Amherst),
  Manuel Matos, Alan R. Peterfreund (SageFox Consulting Group)
Session 3: Computation and The Sciences  
Session Chair: Crystal Peng (Southwestern College)

- **Use of Satellite Imagery in Multidisciplinary Projects** ................................................................. 32  
  Ali Erkan, Jason Hamilton, Tom Pfaff, Michael Rogers (Ithaca College)

- **MPCT: Media Propelled Computational Thinking** ................................................................. 37  
  Eric Andrew Freudenthal, Mary K. Roy, Alexandria Nicole Ogrey,  
  Tanja Magoc (The University of Texas at El Paso), Alan Siegel (New York University)

- **Computational Thinking for the Sciences: A Three Day Workshop for High School Science Teachers** ................................................................. 42  
  Sheikh Iqbal Ahamed, Dennis Brylow, Rong Ge, Praveen Madiraju,  
  Stephen J. Merrill, Craig A. Struble (Marquette University), James P. Early (SUNY Oswego)

Session 4: Curriculum Design  
Session Chair: Yu Cai (Michigan Technological University)

- **Expanding the Frontiers of Computer Science: Designing a Curriculum to Reflect a Diverse Field** ................................................................. 47  
  Mehran Sahami, Alex Aiken, Julie Zelenski (Stanford University)

- **Connecting Across Campus** ................................................................. 52  
  Mark D. LeBlanc, Tom Armstrong, Michael B. Gousie (Wheaton College)

- **Women in CS: An Evaluation of Three Promising Practices** ................................................................. 57  
  Christine Alvarado, Zachary Dodds (Harvey Mudd College)

Session 5: Panel  
Session Chair: Reynold Bailey (Rochester Institute of Technology)

- **Relevant Real-World Undergraduate Research Problems: Lessons From the NSF-REU Trenches** ................................................................. 62  
  Reynold Bailey (Rochester Institute of Technology), Guy-Alain Amoussou (Humboldt State University),  
  Tiffany Barnes (University of North Carolina at Charlotte),  
  Hans-Peter Bischof (Rochester Institute of Technology), Thomas Naps (University of Wisconsin - Oshkosh)

Session 6: Panel  
Session Chair: Valerie Barr (Union College)

- **Building Bridges to Other Departments: Three Strategies** ................................................................. 64  
  Valerie Barr (Union College), Chun Wai Liew (Lafayette College), Rich Salter (Oberlin College)

Session 7: Special Session  
Session Chair: Mark Guzdial (Georgia Institute of Technology)

- **Variations on a Theme: Role of Media in Motivating Computing Education** ................................................................. 66  
  Mark Guzdial (Georgia Institute of Technology), David Ranum, Brad Miller (Luther College),  
  Beth Simon (University of California, San Diego),  
  Barbara Ericson (Georgia Institute of Technology & Lakeside High School),  
  Sam Rebelsky, Janet Davis (Grinnell College), Deepak Kumar, Doug Blank (Bryn-Mawr College)

Session 8: Capstones and Professional Development  
Session Chair: Peter Froehlich (Johns Hopkins University)

- **Using the Imagine Cup SDI as the Foundation for Computer Science Capstone Projects** ................................................................. 68  
  James Parrish, Jr., Janet Bailey (University of Arkansas at Little Rock),  
  Bradley Jensen (Microsoft Corporation)

- **Industry Fellows: Bringing Professional Practice into the Classroom** ................................................................. 72  
  Josh Tenenberg (University of Washington, Tacoma)

- **Teaching Communication, Leadership, and the Social Context of Computing via a Consulting Course** ................................................................. 77  
  Joseph Mertz, Scott McElfresh (Carnegie Mellon University)
Session 9: Upper-Level Courses
Session Chair: Stefan Andrei (Lamar University)
- Digital Visualization Tools Improve Teaching 3D Character Modeling ........................................... 82
  Mark Christensen van Langevel, Robert Kessler (University of Utah)
- Teaching Web Information Retrieval to Undergraduates ................................................................. 87
  Frank McCown (Harding University)
- Electronic Commerce Virtual Laboratory ............................................................................................. 92
  Joel Coffman, Alfred C. Weaver (University of Virginia)

Session 10: Concept Inventories
Session Chair: Keith Shomper (Cedarville University)
- Developing a Validated Assessment of Fundamental CS1 Concepts .................................................. 97
  Allison Elliott Tew, Mark Guzdial (Georgia Institute of Technology)
- Creating the Digital Logic Concept Inventory .................................................................................... 102
  Geoffrey L. Herman, Michael C. Loui, Craig Zilles (University of Illinois at Urbana-Champaign)
- Identifying Student Misconceptions of Programming ......................................................................... 107
  Lisa C. Kaczmarczyk, Elizabeth R. Petrick (University of California, San Diego),
  J. Philip East (University of Northern Iowa), Geoffrey L. Herman (University of Illinois at Urbana-Champaign)

Session 11: Spamming, Hacking, and Social Networks:
Themes for Educating the Next Generation
Session Chair: Wayne Summers (Columbus State University)
- Social Networking: The New Computer Fluency? .............................................................................. 112
  Tarsem S. Purewal Jr. (The University of Tennessee at Chattanooga)
- Educating the Next Generation of Spammers ..................................................................................... 117
  Joel Sommers (Colgate University)
- Teaching the Principles of the Hacker Curriculum to Undergraduates ............................................. 122
  Sergey Bratus, Anna Shubina (Dartmouth College), Michael E. Locasto (George Mason University)

Session 12: Panel
Session Chair: Michael Goldweber (Xavier University)
- What Everyone Needs to Know about Computation ........................................................................... 127
  John Barr (Ithaca College), Steve Cooper (Purdue University), Michael Goldweber (Xavier University),
  Henry Walker (Grinnell College)

Session 13: Special Session
Session Chair: Scott Grissom (National Science Foundation)
- Understanding NSF Funding Opportunities ....................................................................................... 129
  Scott Grissom, Joan Peckham, Harriet Taylor, Guy-Alain Amoussou, Victor Piotrowski
  (National Science Foundation)

Session 14: Special Session
Session Chair: Billy L. Lim (Illinois State University)
- A Web Service-Oriented Approach to Teaching CS/IS1 ................................................................. 131
  Billy L. Lim, Bryan Hosack, Paul Vogt (Illinois State University)

Session 15: Networks and Security
Session Chair: Dennis Brylow (Marquette University)
- Teaching Computer Networks in a Real Network: The Technical Perspectives .................................. 133
  Jianping Pan (University of Victoria)
- IPsecLite: A Tool for Teaching Security Concepts ............................................................................ 138
  Niakam Kazemi, Shiva Azadegan (Towson University)
- Teaching Simplified Network Protocols ............................................................................................ 143
  Dave Feinberg (Carnegie Mellon University)
## Session 16: Course Design
Session Chair: Chenglie Hu (Carroll University)

- **Problem-Directed Discrete Structures Course**
  Norman Neff (The College of New Jersey)
  - 148

- **Reinventing CS50**
  David J. Malan (Harvard University)
  - 152

- **Broadening Student Enthusiasm for Computer Science with a Great Insights Course**
  Marie desJardins (University of Maryland, Baltimore County), Michael Littman (Rutgers University)
  - 157

## Session 17: Coaching and Mentoring
Session Chair: Jan Vahrenhold (Technische Universität Dortmund)

- **Coaching Via Cognitive Apprenticeship**
  Ray Bareiss, Martin Radley (Carnegie Mellon Silicon Valley)
  - 162

- **Increasing Technical Excellence, Leadership and Commitment of Computing Students Through Identity-Based Mentoring**
  Kristy Elizabeth Boyer (North Carolina State University),
  E. Nathan Thomas (University of South Florida Polytechnic),
  Audrey S. Rorrer (University of North Carolina at Charlotte),
  Deonte Cooper (University of South Florida Polytechnic),
  Mladen A. Vouk (North Carolina State University)
  - 167

- **Teaching with Robots: A Service-Learning Approach to Mentor Training**
  R. Brook Osborne, Antony J. Thomas, Jeffrey R. N. Forbes (Duke University)
  - 172

## Session 18: Tools
Session Chair: William Birmingham (Grove City College)

- **The Weiner Lecture Archives: An Ontology-Driven Interface for Viewing Synchronized Lectures and Notes**
  Daniel D. Garcia, Gene Zhang, Sean Carr, Sameer Iyengar, Hava Edelman, Albert Liu (University of California, Berkeley),
  - 177

- **The Design of an Online Environment to Support Pedagogical Code Reviews**
  Christopher Hundhausen, Anukrati Agrawal, Kyle Ryan (Washington State University)
  - 182

- **A Visualization Tool for Tutoring the Interactive Learning of Data Structures and Algorithmic Schemes**
  Rafael del Vado Virseda (Universidad Complutense de Madrid)
  - 187

## Session 19: Panel
Session Chair: Sally Fincher (University of Kent)

- **Comparing Alice, Greenfoot & Scratch**
  Sally Fincher (University of Kent), Stephen Cooper (Purdue University), Michael Kölling (University of Kent),
  John Maloney (Massachusetts Institute of Technology)
  - 192

## Session 20: Panel
Session Chair: Joel C. Adams (Calvin College)

- **Multicore Education: Pieces of the Parallel Puzzle**
  Joel C. Adams (Calvin College), Daniel J. Ernst (University of Wisconsin – Eau Claire),
  Thomas Murphy (Contra Costa College), Ariel Ortiz (Tecnológico de Monterrey, Campus Estado de México)
  - 194

## Session 21: Special Session
Session Chair: David G. Kay (University of California, Irvine)

- **Recognizing the Most Influential CS Education Papers**
  David G. Kay (University of California, Irvine), Kim B. Bruce (Pomona College),
  Michael Clancy (University of California, Berkeley), Nell Dale (The University of Texas at Austin),
  Mark Guzdial (Georgia Institute of Technology), Eric Roberts (Stanford University)
  - 196
Keynote Address
Session Chairs: Thomas J. Cortina (Carnegie Mellon University), Ellen L. Walker (Hiram College)

- **Science Education for the 21st Century:**
  Using the Insights of Science to Teach/Learn Science ......................................................198
  Carl E. Wieman (University of British Columbia & University of Colorado at Boulder)

**Session 22: Philosophy**
Session Chair: Valerie Barr (Union College)
- **What Do “CS1” and “CS2” Mean? Investigating Differences in the Early Courses** ........199
  Matthew Hertz (Canisius College)
- **Braided Teaching in Secondary CS Education: Contexts, Continuity, and the Role of Programming** .................................................................204
  Arno Pasternak, Jan Vahrenhold (Technische Universität Dortmund)
- **Writing in an Upper-Level CS Course** ..............................................................209
  Alan Garvey (Truman State University)

**Session 23: Concurrency**
Session Chair: Robert Walker (Kent State University)
- **A Breadth-First Course in Multicore and Manycore Programming** ........................214
  Suzanne Rivoire (Sonoma State University)
- **Test-First Java Concurrency for the Classroom** ......................................................219
  Mathias Ricken, Robert Cartwright (Rice University)
- **Introducing Concurrency in CS 1** ........................................................................224
  Kim B. Bruce (Pomona College), Andrea Danyluk, Thomas Murtagh (Williams College)

**Session 24: Middle School Issues**
Session Chair: Barbara Ericson (Georgia Tech)
- **A Technology Infused Science Summer Camp to Prepare Student Leaders in 8th Grade Classrooms** ....................................................................229
  Youwen Ouyang, Katherine Hayden (California State University San Marcos)
- **Design and Evaluation of a Computer Science and Engineering Course for Middle School Girls** ...........................................................234
  Gabriela Marcu (Carnegie Mellon University), Samuel J. Kaufman (University of California, Irvine), Jaihee Kate Lee (Brea Olinda High School), Rebecca W. Black, Paul Dourish, Gillian R. Hayes, Debra J. Richardson (University of California, Irvine)
- **Computational Thinking via Interactive Journalism in Middle School** .......................239
  Ursula Wolz (The College of New Jersey), Meredith Stone (Independent Evaluator), Sarah M. Pulimood, Kim Pearson (The College of New Jersey)

**Session 25: Pairs and Partners**
Session Chair: Suzanne Buchele (Southwestern University)
- **Compatibility of Partnered Students in Computer Science Education** ..................244
  Joshua Sennett, Mark Sherriff (University of Virginia)
- **The Benefits of Pairing by Ability** ........................................................................249
  Grant Braught, John MacCormick, Tim Wahls (Dickinson College)
- **Making Contact with the Forgotten K-12 Influence: Are You Smarter Than YOUR 5th Grader?** .................................................................254
  Mindy L. Hart (Purdue University)

**Session 26: Panel**
Session Chair: Mark Guzdial (Georgia Institute of Technology)
- **Report on the Future of Computing Education Summit** ........................................259
  Mark Guzdial (Georgia Institute of Technology), Jane Prey (Microsoft Research), Lucy Sanders (NCWIT and University of Colorado at Boulder), Heikki Topi (Bentley University), Joseph Urban (Texas Tech University)
Session 27: Special Session
Session Chair: Robert Schnabel (Indiana University)
- Surfacing Computer Science in STEM Education .................................................. 261
  Robert Schnabel (Indiana University), Susan Rodger (Duke University),
  Mark Stehlik (Carnegie Mellon University),
  Chris Stephenson (Computer Science Teachers Association), John White (ACM)

Session 28: Special Session
Session Chair: Daniel D. Garcia (University of California, Berkeley)
- If you Might Be a Computational Thinker! ............................................................... 263
  Daniel D. Garcia, Colleen M. Lewis (University of California, Berkeley),
  John P. Dougherty (Haverford College), Matthew C. Jadud (Allegheny College)

Session 29: Games
Session Chair: Monica McGill (Bradley University)
- Scalable Game Design and the Development of a Checklist
  for Getting Computational Thinking into Public Schools .................................. 265
  Alexander Repenning, David Webb (University of Colorado), Andri Ioannidou (AgentSheets Inc.)
- Game-Themed Programming Assignments for Faculty: A Case Study .................. 270
  Cinnamon Hillyard, Robin Angotti (University of Washington, Bothell),
  Michael Panitz (Cascadia Community College), Kelvin Sung (University of Washington, Bothell),
  John Nordlinger (Microsoft Research), David Goldstein (University of Washington, Bothell)
- What Game Developers Look for in a New Graduate: Interviews
  and Surveys at One Game Company ................................................................. 275
  Michael Hewner, Mark Guzdial (Georgia Institute of Technology)

Session 30: Parallel Computing
Session Chair: Hong Lin (University of Houston-Downtown)
- Parallel Computing: At the Interface of High School and Industry ....................... 280
  Robert A. Chesebrough (Intel Corporation), Ivan Turner (Brooklyn Technical High School)
- Using Microlabs to Teach Modern Distributed Computing ................................ 285
  Barry L. Kurtz, Rahman Tashakkori, John J. Helfert, Michael Sage (Appalachian State University)
- Is Teaching Parallel Algorithmic Thinking to High School Students Possible?
  One Teacher's Experience .................................................................................. 290
  Shane Torbert (Thomas Jefferson High School for Science and Technology),
  Uzi Vishkin (The University of Maryland Institute for Advanced Computer Studies),
  Ron Tzur (University of Colorado Denver), David J. Ellison (Indiana University Bloomington)

Session 31: CS Education Research I
Session Chair: John Dooley (Knox College)
- Introductory Computing Students' Conceptions
  of Illegal Student-Student Collaboration ....................................................... 295
  Michael Stepp, Beth Simon (University of California, San Diego)
- Harnessing Surprise: Tales from Students' Transformational Biographies ............ 300
  Lynda Thomas (Abertay University), Carol Zander (University of Washington, Bothell),
  Anna Eckerdal (Uppsala University)
- Collaborative Research in Computer Science Education: A Case Study ............. 305
  Sue Fitzgerald (Metropolitan State University), Brian Hanks (Fort Lewis College),
  Renée McCauley (College of Charleston)

Session 32: K-12 Instruction
Session Chair: Carol Taylor (Eastern Washington University)
- Development and Application of a Web-Based Programming Learning System
  with LED Display Kits ...................................................................................... 310
  Seok-Ju Chun (Seoul National University of Education), Jungwoo Ryoo (The Pennsylvania State University-Altoona)
• A Strategy for Collaborative Outreach: Lessons from the CSbots Project .................................................. 315
  Tom Lauwers, Emily Hamner, Illah Nourbakhsh (Carnegie Mellon University)

• A K-12 College Partnership .................................................. 320
  Stephen Cooper (Purdue University), Wanda Dann (Carnegie Mellon University),
  John Harrison (Princess Anne High School)

Session 33: Panel
Session Chair: Paul Gestwicki (Ball State University)

• Novel Approaches to CS 0 with App Inventor for Android .................................................. 325
  Ellen Spertus (Mills College), Mark L. Chang (Olin College), Paul Gestwicki (Ball State University),
  David Wolber (University of San Francisco)

Session 34: Panel
Session Chair: Youwen Ouyang (California State University, San Marcos)

• Effective Delivery of Computing Curriculum in Middle School
  — Challenges and Solutions .................................................. 327
  Youwen Ouyang (California State University, San Marcos), Ursula Wolz (The College of New Jersey),
  Susan H. Rodger (Duke University)

Session 35: Special Session
Session Chair: Owen Astrachan (Duke University)

• Re-Imagining the First Year of Computing .................................................. 329
  Owen Astrachan (Duke University), Kathleen Haynie (Haynie Research and External Evaluation),
  Chris Stephenson (Computer Science Teachers Association), Lien Diaz (College Board),
  Amy Briggs (Middlebury College)

Session 36: Peers
Session Chair: Curtis Hill (Valley City State University)

• Peer Review in CS2: Conceptual Learning .................................................. 331
  Scott Turner (ECPI College of Technology),
  Manuel A. Pérez-Quifiones, Stephen Edwards (Virginia Tech), Joseph Chase (Radford University)

• Turning Exams into a Learning Experience .................................................. 336
  Benjamin Yu, George Tsiknis, Meghan Allen (University of British Columbia)

• Experience Report: Peer Instruction in Introductory Computing .................................................. 341
  Beth Simon, Michael Kohanfars, Jeff Lee, Karen Tamayo (University of California, San Diego),
  Quintin Cutts (University of Glasgow)

Session 37: Scratch
Session Chair: Kelvin Sung (University of Washington, Bothell)

• How Programming Environment Shapes Perception, Learning and Goals:
  Logo vs. Scratch .................................................. 346
  Colleen M. Lewis (University of California, Berkeley)

• Teaching Computational Thinking Through Musical Live Coding in Scratch .................................................. 351
  Alex Ruthmann, Jesse M. Heines, Gena R. Greher, Paul Laidler, Charles Saulters II
  (University of Massachusetts, Lowell)

• Scratching Middle Schoolers’ Creative Itch .................................................. 356
  Joel C. Adams (Calvin College)

Session 38: Computer Organization
Session Chair: Zachary Kurmas (Grand Valley State University)

• A Simple Machine Simulator for Teaching Stack Frames .................................................. 361
  Dino Schweitzer, Jeff Boleng (United States Air Force Academy)

• In the Zone: Virtual Computing on a Budget .................................................. 366
  Stan J. Thomas, Paul M. Whitener (Wake Forest University)

• The Pep/8 Memory Tracer: Visualizing Activation Records on the Run-Time Stack .................................................. 371
  J. Stanley Warford, Chris Dimpfl (Pepperdine University)
Session 39: Teaching Gems
Session Chair: Anna Cavender (University of Washington)

- Monetary Values: Double Trouble or Dollars and Sense? .............................................................. 376
  Aaron Tenenbaum, Gerald Weiss, David Amow (Brooklyn College)
- Double Sorting: Testing Their Sorting Skills .................................................................................. 381
  Darrah P. Chavey (Beloit College)
- The Baffling CS Notions of “As-if” and “Don’t-care” ................................................................. 385
  David Ginat (Tel-Aviv University)

Session 40: Panel
Session Chair: Susanne Hambrusch (Purdue University)

- Computational Thinking in High School Courses ........................................................................ 390
  Vicki Allan (Utah State University), Valerie Barr (Union College), Dennis Brylow (Marquette University), Susanne Hambrusch (Purdue University)

Session 41: Panel
Session Chair: Doug Baldwin (SUNY Geneseo)

- Some Developments in Mathematical Thinking for Computer Science Education Since Computing Curricula 2001 ................................................................. 392
  Doug Baldwin (SUNY Geneseo), Bill Marion (Valparaiso University), Murali Sitaraman (Clemson University), Cinda Heeren (University of Illinois at Urbana-Champaign)

Session 42: Panel
Session Chair: Daniel D. Garcia (University of California, Berkeley)

- Rediscovering the Passion, Beauty, Joy, and Awe: Making Computing Fun Again, Part 3 .......... 394
  Daniel D. Garcia (University of California, Berkeley), Gail Chapman (Computer Science Teachers Association), Orit Hazzan (Technion - Israel Institute of Technology), Maggie Johnson (Google), Leigh Ann Sudol (Carnegie Mellon University)

Session 43: Global Perspectives
Session Chair: Lynda Thomas (Aberystwyth University)

- Undergraduate Computer Science Education in China .............................................................. 396
  Ming Zhang (Peking University), Virginia Lo (University of Oregon)
- A Survey of Computer Science Teacher Preparation Programs in Israel Tells Us: Computer Science Deserves a Designated High School Teacher Preparation! ......................................................... 401
  Noa Ragonis (Beit Berl College), Orit Hazzan (Technion – Israel Institute of Technology), Judith Gal-Ezer (The Open University of Israel)
- The Interaction Between High School Curriculum and First Year College Courses: The Case of Computing ..................................................................................... 406
  Adrian H. Yahya (Birzeit University)
- Internationalization of Computer Science Education .................................................................... 411
  Sarah Douglas, Art Farley, Virginia Lo, Andrzej Proskurowski, Michal Young (University of Oregon)

Session 44: CS Education Research II
Session Chair: Kimberly Voll (University of British Columbia)

- Empirical Evidence for the Existence and Uses of Metacognition in Computer Science Problem Solving ......................................................................................... 416
  Jennifer Parham, Leo Gugerty, D. E. Stevenson (Clemson University)
- Peerswise: Replication Study of a Student-Collaborative Self-Testing Web Service in a U.S. Setting ................................................................................................. 421
  Paul Denny (The University of Auckland), Brian Hanks (Fort Lewis College), Beth Simon (University of California, San Diego)
• How Interactive Multimedia Authoring Transforms Object-Oriented Thinking ........................................ 426
  Timothy T. Yuen (The University of Texas at San Antonio), Min Liu (The University of Texas at Austin)

• Manipulating Mindset to Positively Influence Introductory Programming Performance ........................................ 431
  Quintin Cutts (University of Glasgow), Emily Cutts (Centre for Confidence and Well-being),
  Stephen Draper, Patrick O’Donnell, Peter Saffrey (University of Glasgow)

Session 45: Assessment
Session Chair: Adrian German (Indiana University)

• Analyzing Test Items: Using Item Response Theory to Validate Assessments ........................................ 436
  Leigh Ann Sudol, Cassandra Studer (Carnegie Mellon University)

• Using Strategies for Assessment of Programming Exercises ........................................ 441
  Alex Gerdes (Open Universiteit Nederland), Johan T. Jeuring (Utrecht University),
  Bastiaan J. Heeren (Open Universiteit Nederland)

• Measuring High School Students’ Attitudes Toward Computing ........................................ 446
  Daniel Heersink, Barbara M. Moskal (Colorado School of Mines)

• An Advanced Assessment Tool and Process ........................................ 451
  Legend L. Burge, Ronald J. Leach (Howard University)

Session 46: Supporting Student Learning
Session Chair: Roy Pargas (Clemson University)

• 24/7 Lectures as an Exam Review Technique ........................................ 455
  James B. Fenwick Jr., Cindy Norris (Appalachian State University),
  Andrew R. Dalton, William Kreahling (Western Carolina University)

• Principles of Asking Effective Questions During Student Problem Solving ........................................ 460
  Kristy Elizabeth Boyer, William Lahti (North Carolina State University),
  Mladen A. Vouk, James C. Lester (North Carolina State University)

• Computer Science Illustrated: Engaging Visual Aids for Computer Science Education ........................................ 465
  Ketrina Yim, Daniel D. Garcia, Sally Ahn (University of California, Berkeley)

• Using You Tube to Enhance Student Class Preparation in an Introductory Java Course ........................................ 470
  Martin C. Carlisle (United States Air Force Academy)

Session 47: Special Session
Session Chair: Clifford A. Shaffer (Virginia Tech)

• Building an Online Educational Community for Algorithm Visualization ........................................ 475
  Clifford A. Shaffer (Virginia Tech), Thomas L. Naps (University of Wisconsin – Oshkosh),
  Susan H. Rodger (Duke University), Stephen H. Edwards (Virginia Tech)

Session 48: Special Session
Session Chair: Paul Tymann (Rochester Institute of Technology)

• The Development and Use of Scoring Rubrics (Or How to Grade Thousands of Exams without Losing Your Mind) ........................................ 477
  Karen Donathan (George Washington High School), Paul Tymann (Rochester Institute of Technology)

Session 49: Special Session
Session Chairs: Nick Parlante, Julie Zelenski (Stanford University)

• Nifty Assignments ........................................ 478
  Nick Parlante, Julie Zelenski (Stanford University),
  Zachary Dodds, Wynn Vonneugut (Harvey Mudd College),
  David J. Malan (Harvard University), Thomas P. Murtagh (Williams College),
  Todd W. Neller (Gettysburg College), Mark Sherriff (University of Virginia),
  Daniel Zingaro (University of Toronto)
Session 50: Operating Systems
Session Chair: Weiqing Sun (University of Toledo)

- Teaching Operating Systems Using Virtual Appliances and Distributed Version Control .................................................. 480
  Oren Laadan, Jason Nich, Nicolas Viennot (Columbia University)
- Linux Kernel Projects for an Undergraduate Operating Systems Course ................................................................. 485
  Rob Hess, Paul Paulson (Oregon State University)
- Teaching Operating Systems — Windows Kernel Projects ............................................................................................ 490
  Alexander Schmidt, Andreas Polze (Hasso Plattner Institute at University of Potsdam), Dave Probert (Microsoft Corporation)

Session 51: Active Learning
Session Chair: Salvador Garcia-Martinez (Concordia University)

- Evaluating the Impact of PBL and Tablet PCs in an Algorithms and Computer Programming Course .......................... 495
  Ana Paula L. Ambrósio, Fábio M. Costa (Federal University of Goiás)
- Does Studio-Based Instruction Work in CS1? An Empirical Comparison with a Traditional Approach ......................... 500
  Christopher Hundhausen, Anukrati Agrawal, Dana Fairbrother, Michael Trevisan (Washington State University)
- Implementing Studio-Based Learning in CS2 ..................................................................................................................... 505
  Dean Hendrix, Lakshman Myneni, Hari Narayanan, Margaret Ross (Auburn University)

Session 52: Programming Language Issues
Session Chair: Ariel Ortiz (Tecnológico de Monterrey, Campus Estado de México)

- Using Contour Diagrams and JIVE to Illustrate Object-Oriented Semantics in the Java Programming Language .............. 510
  James T. Streib, Takako Soma (Illinois College)
- Interfaces First (and Foremost) with Java ............................................................................................................................ 515
  Paolo A. G. Sivilotti (The Ohio State University), Matthew Lang (Moravian College)
- Performance of Python CS1 Students in Mid-Level Non-Python CS Courses ................................................................. 520
  Richard J. Enbody, William F. Punch (Michigan State University)

Session 53: Computing for the Social Good
Session Chair: Phillip Barry (University of Minnesota)

- Integrating Sustainability into Undergraduate Computing Education ............................................................................. 524
  Yu Cai (Michigan Technological University)
- An Approach to Integrating ICTD Projects into an Undergraduate Curriculum ......................................................... 529
- In Their Words: Student Feedback on an International Project Collaboration .............................................................. 534
  Archana Chidanandan (Rose-Hulman Institute of Technology), Lori Russell-Dag (Bilkent University), Cary Laxer (Rose-Hulman Institute of Technology), Reyyan Ayfer (Bilkent University)

Session 54: CS-1 Issues
Session Chair: Paul Gestwicki (Ball State University)

- Closed Labs in Computer Science I Revisited in the Context of Online Testing ......................................................... 539
  Amruth N. Kumar (Ramapo College of New Jersey),
- How Do Computing Faculty Adopt Curriculum Innovations? The Story From Instructors ............................................ 544
  Lijun Ni (Georgia Institute of Technology), Tom McKlin (The Findings Group), Mark Guzdial (Georgia Institute of Technology)
- CS1, Arcade Games and the Free Java Book .......................................................................................................................... 549
  Daniel L. Schuster (Western State College of Colorado)
Session 55: Panel
Session Chair: J. McGrath Cohoon (University of Virginia)
- Consultants on Systemic Reform for Gender Balance .................................................. 554
  J. McGrath Cohoon, Leisa D. Thompson (University of Virginia), Jennifer J. Goodall (University at Albany),
  Rebecca L. Dohrman (Purdue University), Elizabeth Litzler (University of Washington)

Session 56: Special Session
Session Chair: Guy-Alain Amoussou (National Science Foundation)
- Interdisciplinary Computing Education for the Challenges of the Future .......................... 556
  Guy-Alain Amoussou, Myles Boylan, Joan Peckham (National Science Foundation)

Session 57: Special Session
Session Chair: Robert McCartney (University of Connecticut)
- It Seemed Like a Good Idea at the Time ........................................................................... 558
  Jonas Boustedt (University of Gävle), Robert McCartney (University of Connecticut),
  Josh Tenenberg (University of Washington, Tacoma), Edward F. Gehringer (North Carolina State University),
  Raymond Lister (University of Technology, Sydney), Dave Musicant (Carleton College)

Keynote Address
Session Chairs: Gary Lewandowski (Xavier University), Steven Wolfman (University of British Columbia)
- Suddenly, All Computing Is Parallel: Seizing Opportunity Amid the Clamor ...................... 560
  Michael Wrinn (Intel Corporation)

SIGCSE 2010 Workshops ........................................................................................................ 561
SIGCSE 2010 Birds of a Feather .............................................................................................. 570
SIGCSE 2010 Poster Sessions ................................................................................................. 577
SIGCSE 2010 Video Exhibition Abstracts .................................................................................. 582
SIGCSE 2010 SRC Graduate Student Research Abstracts ....................................................... 584
SIGCSE 2010 SRC Undergraduate Student Research Abstracts .............................................. 585

Author Index ............................................................................................................................ 587