Consortium for
Computing Sciences in Colleges
In cooperation with

The Association for
Computing Machinery
Special Interest Group
on Computer Science Education
presents

CCSCNE-2015

The Twentieth Annual Consortium for Computing Sciences in Colleges Northeastern Conference

COLLEGE OF THE
Holy Cross

April 17 - 18, 2015
Worcester, MA

Table of Contents

CCSCNE 2015 Chairs' Welcome

Welcome to the Twentieth Annual Consortium for Computing Sciences in Colleges Northeast Region Conference, Worcester, and to the College of the Holy Cross.

This year's program is the result of the hard work of a diligent conference committee and a dedicated board. We are honored to have two invited speakers, Sep Kamvar of MIT and Kim Bruce of Pomona College. In addition, we have a broad range of paper presentations, panels, tutorials, workshops and a large and interesting collection of student research posters. A new category of presentations is lightning talks. The traditional programming contest should be fun for everyone. We are holding a Hackfest for the second year. This year it is being run by OpenHatch and their Open Source Comes to Campus program. We are confident this program will appeal to both teachers and students of computing sciences.

We are fortunate to have worked with wonderful people. Without the committee, the board, the reviewers, session chairs and countless other volunteers this conference could not be the well-established success it is. The conference continues to be selective as we accepted 15 out of 29 papers for a rate of just under 52%. This will ensure the high-quality program that participants have come to expect.

We are pleased to be hosting this year's conference in Worcester, a city with a large and diverse collection of colleges. And we are especially pleased to be holding the conference in the Hogan Conference Center of the College of the Holy Cross. Holy Cross is proud of its facilities and its liberal arts education in the Jesuit tradition. An exclusively undergraduate institution with approximately 2,800 students, Holy Cross is the oldest Catholic college in New England.

We hope you find the conference both rewarding and enjoyable. We also look forward to seeing you next year at Hamilton College in Clinton, NY.

Laurie Smith King,
College of the Holy Cross

Karl R. Wurst,
Worcester State University
Conference Co-Chairs

CCSCNE 2015 Committee

Laurie Smith King
Conference Co-Chair
College of the Holy Cross

Karl Wurst
Conference Co-Chair, Vendors Chair
Worcester State University

Frank Ford
Programming Contest Co-Chair
Providence College

Delbert Hart
Programming Contest Co-Chair
SUNY Plattsburgh

Kevin Walsh
Programming Contest Co-Chair
College of the Holy Cross

Ian MacDonald
Papers Co-Chair
The College of Saint Rose

Stan Kurkovsky
Papers Co-Chair
Central Connecticut State Univerity

Jim Teresco
Program Chair
The College of Saint Rose

Susan Imberman
Panels and Lightning Talks Co-Chair
College of Staten Island

Yana Kortsarts
Panels and Lightning Talks Co-Chair
Widener University

Sandeep Mitra
Student Posters Co-Chair
The College at Brockport

Alice Fisher
Student Posters Co-Chair
University of New Haven

Robert Dugan
Student Posters Co-Chair
Stonehill College

Aparna Mahadev
Student Posters Co-Chair
Worcester State University

Bonnie MacKellar
Tutorials and Workshops Co-Chair
St. John's University

Krista Hill
Tutorials and Workshops Co-Chair
University of Hartford

Mark Hoffman
Registration Chair
Quinnipiac University

Nadine Hanebutte
Publicity Chair
St. John Fisher College

John Russo
Faculty Posters Chair
Wentworth Institute of Technology

Ingrid Russell
Speaker Co-Chair
University of Hartford

Val Kolesnikov
Speaker Co-Chair
Manhattan College

Stoney Jackson
Hackfest Co-Chair
Western New England College

Heidi Ellis
Hackfest Co-Chair
Western New England College

Padmaja Bandaru
K-12/CSTA Co-Chair
Advanced Math and Science Academy

Kelly Powers
K-12/CSTA Co-Chair
Education Development Center, Inc.

Conference Supporters

GOLD SPONSOR

SILVER SPONSORS
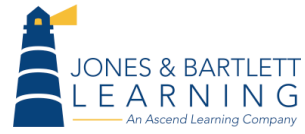
NATIONAL PARTNERS

Program of Events: Friday, April 17

Registration (7:45 AM – 4:00 PM)

Registration   Hogan Atrium

Programming Contest (7:45 AM – 12:30 PM)

7:45   Registration of teams   Hogan Atrium

7:45   Breakfast   Spillane Atrium

8:40   Pre-contest instructions   Smith Labs 154

9:00   Contest   Haberlin Lab 136 and 204, Swords Lab 219

12:00 Programming contest lunch   Swords Room 352

Pre-Conference Workshops (9:00 AM – 12:00 PM)

Workshop 1:   Hogan Room 320
Computational Thinking in Greenfoot AI Game Strategies for CS1
    Michael Jonas, University of New Hampshire at Manchester
    Mihaela Sabin, University of New Hampshire at Manchester

Workshop 2:   Hogan Room 401
Introducing Secure Coding in CS0, CS1, and CS2
    Siddharth Kaza, Towson University
    Blair Taylor, Towson University
    Elizabeth K. Hawthorne, Union County College

Workshop 3:   Hogan Room 408/409
Teaching Software Engineering with Lego Serious Play
    Stan Kurkovsky, Central Connecticut State University

Workshop 4   Hogan Room 402/403
Chapel: A Versatile Language for Teaching Parallel Programming
    Kyle Burke, Plymouth State University

Welcome (1:00 PM – 1:15 PM)

Welcome Address   Hogan Third Floor Ballroom
    Margaret Frieje, Ph.D.
    Vice President for Academic Affairs and Dean of the College
    Professor of Mathematics

Plenary Session 1 (1:15 PM – 2:15 PM)

Self-Limiting Software and   Hogan Third Floor Ballroom
Sociotechnical Ecosystems
    Sep Kamvar, MIT Media Lab

Break (2:15 PM – 2:30 PM) - Hogan Third Floor Lounge

Hackfest for Students and Faculty (2:30 PM – 9:00 PM)

Hackfest & Pizza   Hogan Room 320

Concurrent Session 1 (2:30 PM – 3:45 PM)

Paper Session 1A: *Curricular Issues*   Hogan Room 401
(Session chair: Michael Gousie)

**Preliminary Analysis of the 2014 Snapshot of SUNY CS
Gatekeeper Courses**
    Sen Zhang, SUNY Oneonta
    Cynthia Marcello, SUNY Sullivan
    Arthur Hoskey, Farmingdale State College
    Howard Reed, SUNY Delhi
    James Antonakos, Broome Community College

A Dual-Major Course Emphasizing Computer Science and Graphic Design
    Fred Martin, University of Massachusetts Lowell
    Mark Sherman, University of Massachusetts Lowell

**Public Debate Format for the Development of Soft Skill Competency in
Computer Science Curricula**
    Christopher Stuetzle, Merrimack College

Tutorial Session 1B   Hogan Room 402/403

Quick Git Setup Tutorial
    Joseph Lawrance, Wentworth Institute of Technology
    Seikyung Jung, Bridgewater State University

Panel Session 1C   Hogan Room 406/407
(Session chair: Yana Kortsarts)

Making Interdisciplinary Courses and Projects Work
    Bonnie MacKellar, St. John's University
    Joan Peckham, University of Rhode Island
    Jesse Heines, University of Massachusetts Lowell
    Margaret Menzin, Simmons College
    UrsulaWolz, RiverSound Solutions

Vendor Session 1D   Hogan Room 408/409
(Kim Yohannan, EMC)

EMC Academic Alliance – Educating Future IT Professionals
Learn how you can enhance student career prospects in the world of IT through the Academic Alliance. The program offers colleges and universities around the globe unique 'open' curriculum-based education, such as storage, cloud computing and big data analytics. The courses focus on technology concepts and principles applicable to any vendor environment. The goal is to prepare graduates to fully leverage enhanced and emerging technologies in virtualized and cloud environments. There is no cost to institutions to join the program and members receive numerous benefits including: faculty training, course materials, and secure web portals for faculty and students.

> **Break (3:45 PM – 4:15 PM) - Hogan Third Floor Lounge**

Concurrent Session 2 (4:15 PM – 5:30 PM)

Paper & Lightning Talks Session 2A: *Curricular Issues*   Hogan Room 401
(Session chair: Joan E. DeBello)

Algorithmic Thinking Unplugged
    Ed Lamanga, University of Rhode Island

The Assessment of Mobile Computational Thinking
    Mark Sherman, University of Massachusetts Lowell
    Fred Martin, University of Massachusetts Lowell

An Abstract Game for Each Data Structure (Lightning Talk)
    Kyle Burke, Plymouth State University

Panel Session 2B: Hogan Room 406/407
(Session chair: Yana Kortsarts)

**Lessons from Women's College: What Works, What Doesn't, and
What Will Work Elsewhere**
    Nanette Veilleux, Simmons College
    Barbara Lerner, Mount Holyoke College
    Jean Herbst, Wellesley College
    Christopher Andrews, Middlebury College

Tutorial Session 2C   Hogan Room 408/409

Using the Cloud as Middleware
    Delbert Hart, SUNY Plattsburgh

Social Hour (5:30 PM - 7:00 PM) - Hogan Third Floor Lounge

Faculty Posters	Third Floor Lounge
Student Posters	Hogan Rooms 304/305 and 328

Dinner Banquet (7:00 PM – 9:00 PM)

Presentation of Awards   Hogan Third Floor Ballroom

Program of Events: Saturday, April 18

Registration (7:30 AM – 10:00 AM)

Registration   Hogan Third Floor Atrium

Breakfast (8:00 AM – 9:00 AM)

Light Continental Breakfast   Hogan Third Floor Lounge

Concurrent Session 3 (9:00 AM – 10:15 AM)

Papers Session 3A: *Engaging Approaches*   Hogan Room 401
(Session chair: Daniel Rogers)

Using Packet Sniffing to Teach Networking Concepts
    Bruce Tis, Simmons College

Cybersecurity Games Can Be Interactive, Fun, Educational and Engaging
    Thomas Sharkey, Massbay Community College
    Catherine Huang, Massbay Community College
    Ian Cullinane, Massbay Community College
    Shamsi Moussavi, Massbay Community College

The Social Side of CS: Engaging Undergraduate Computer Science
Students in the IRBProcess for Research Investigating Cyberbullying in Online
Multi-Player Gaming Environments
    Jami Cotler, Siena College
    Meg Fryling, Siena College
    Lauren Mathews, Siena College
    Shauna Pratico, Siena College

Paper & Lightning Talks Session 3B: *Pedagogy*   Hogan Room 402/403
(Session chair: Stoney Jackson)

Teaching Greedy Algorithms Using a Single Problem Domain
    Joan Lucas, College at Brockport

On Adding a Critical Thinking Module to a Discrete Structures Course
 Michael Scheessele, Indiana University South Bend
 Hang Dinh, Indiana University South Bend
 Mahesh Ananth, Indiana University South Bend

**Challenges in Designing an Introductory Course in Big
Data Programming (Lightning Talk)**
 Roland Depratti, Eastern Connecticut State University
 Gerrett Dancik, Eastern Connecticut State University
 Sara Tasneem, Eastern Connecticut State University

Panel Session 3C   Hogan Suite A
(Session chair: Susan Imberman)

**Introductory Computer Science Courses: A Discussion about the
Rewards, Challenges and Connections among the Courses
Taught at the Secondary and College Level**
 Ann Moskol, Rhode Island College
 Michael Deslauriers, Smithfield High School
 Joan Peckham, University of Rhode Island
 Dominic Herard, Times Squared STEM Academy

Vendor Session 3D   Hogan Suite B/C
(David Arnow, Turing's Craft)

Creating Your Own Exercises in CodeLab and MyProgrammingLab
CodeLab provides hundreds of short programming exercises in each commonly
taught intro programming language. In case that's not enough for you or if you
want to arrange for your favorite homework programming assignments to be
automatically checked (with feedback to students), it's now easier than ever in
the latest edition of CodeLab.

Plenary Session 2 (10:15 AM – 11:15 AM)

Programming with Grace   Hogan Third Floor Ballroom
 Kim Bruce, Pomona College

Break (11:15 AM – 11:30 AM) - Hogan Third Floor Lounge

Concurrent Session 4 (11:30 AM – 12:45 PM)

Paper Session 4A: *Social and Outreach*   Hogan Room 401
(Session chair: Adrian Ionescu)

Using Web Conferencing to Foster Learning Partnerships in a Team Based Learning Computer Science Classroom
> Jami Cotler, Siena College
> Dima Kassab, University at Albany
> Xiaojun Yuan, University at Albany

Evaluation of a Computing and Engineering Outreach Program for Girls in Grades 8-10.
> Mihaela Sabin, University of New Hampshire
> Paul Snow, Independent Consultant
> Mary Laturnau, Project Lead The Way, Inc.

Involving High School Students with Visualization and Image Processing
> Rahman Tashakkori, Appalachian State University
> Ahmad Ghadiri, Appalachian State University
> Sina Tashakkori, Appalachian State University

Tutorial Session 4B   Hogan Room 402/403

Adopting a "Flipped" Interactive Pedagogy Using Teachback
> Timothy J. Hickey, Brandeis University
> William T. Tarimo, Brandeis University

Paper Session 4C: *Labs*   Hogan Suite A
(Session chair: Larry D'Antonio)

Droplet, a Blocks-Based Editor for Text Code
> David Bau, Phillips Exeter Academy

Automatic Evaluation of Computer Programs Using Moodle's Virtual Programming Lab (VPL) Module
> Dominique Thiebaut, Smith College

Membership Meeting (1:00 PM – 1:30 PM) - Hogan Suite A

Board Meeting (1:30 PM – 3:30 PM) - Hogan Suite A

Faculty Posters

1. **Promoting Student Engagement in Fundamental Java Programming Classes using a Poll Software System**
   Ying Liu, St. John's University

2. **The Spinoza Code Tutor**
   Timothy Hickey, Brandeis University
   Fatima Abu Deeb, Brandeis University

3. **Attracting Underrepresented Students to Engineering and Computer Science**
   Sarbani Banerjee, SUNY Buffalo State College

4. **An Interdisciplinary Model for Computer Science, Mathematics, and Environmental Science for Non-Majors**
   Frances Bailie, Srilal Krishnan, Joseph Stabile, Iona College

5. **Team Project Experiences in Humanitarian Free and Open Source Software (HFOSS)**
   Stoney Jackson, Western New England University
   Heidi Ellis, Western New England University
   Gregory Hislop, Drexel University
   Lori Postner, Nassau Community College

6. **Creating Online Programming Boot Camps**
   Lisa MacLean, Wentworth Institute of Technology

Student Posters

5001: Virtual Metrics: A New Way to Size Things Up
Cara Villareal and Rachel Wolf, Christopher Newport University

5002: Design and Implementation of Steganography and Steganalysis Techniques
Andrew Miller and Justin Spedding, Widener University

5003: Developing Digital Learning Objects to Enhance Students Learning
Gordon Hall, Westfield State University

5004: Producing the Optimal Configurations for the Intercardinal Extension to the Aggregation Index
Tibor Mirkovic and Nicolas Taliceo, Westfield State University

5005: Optimal Band Selection for Hyperspectral Data using GPU
Michael Estwanick, Montclair State University

5006: Exploring Extracurricular Activities to Enhance Retention and Recruitment of Women into Computing Disciplines
Noella Noel and Tulsi Patel, Widener University

5007: Loading A Plane: A Simulation in Processing
Halle Kent, Saint Anselm College

5008: TwitterTrails: A Tool for Following the Spread of Rumors
Lindsey Tang, Kily Wong and Laura Zeng, Wellesley College

5009: Water Quality Sensors
Tyler Dalious, Tyler Garrett, Chris Jeffery and Josh Lowe, Shippensburg University

5011: Pig Latin Programming Language
Ryan Steimetz, Wentworth Institute of Technology

5012: 2D to 3D Conversion and Printing
Heather Corraccio, Quinnipiac University

5013: Finding the Optimal Route Around an Amusement Park to Maximize Fun and Minimize Time by Applying a Parallel Genetic Algorithm to the Traveling Salesman Problem
Megan DeLaney, Massachusetts Bay Community College

5014: Artificial Intelligence in Video Games
Frederick Kissinger III, Chestnut Hill College

5015: Investigation of Transliteration Algorithm Operation in Real Time for Augmented Reality
Jon Battison, Buffalo State College SUNY

5017: In Moving Color: Motion Controlled Art Program
Adam Doktor, Buffalo State College SUNY

5018: Big Data in Transit
James Corpening, Buffalo State College SUNY

5019: Shapeshifter of Py
Steven Maciejewski, Buffalo State College SUNY

5020: Malware Analysis: A Different Approach
Thomas Stachowski, Buffalo State College SUNY

5021: Visualizing the Spread of a Virus on Campus
Lujun Jian, Smith College

5022: Liberal Arts Modules for CS 1
Jackie Byun, Smith College

5023: Virtual Reality Visualization with the Oculus Rift
Nicholas Wereszczak, University of New Haven

5024: A Repository of Cloud Services for Micro-enterprises
Matthew Panebianco, The College at Brockport SUNY

5025: The Visible and Invisible in a MOOC Discussion Forum
Jessica Bu, Wellesley College

5026: Towards a Concept Map of App Inventor for Introductory Computer Science
Sara Burns, Wellesley College

5027: Fully Hardware Neural Network with Arduino Nodes Implemented with Backpropagation on a Remote Controlled Car
Mohammad Khan, Connecticut College

5028: Type-O's
Andrew Wagner, Buffalo State College SUNY

5029: Computer Simulation of Natural Sciences Problems in Virtual Environment
Daniel Sturniolo, SUNY Fredonia

5030: Creating a Watch Face for Android Wear
David Dulski, Buffalo State College SUNY

5031: Forms of Cognitive Apprenticeship Methods Applied in FOSS Environments
Fulya Koc, Western New England University
Claudia Smith, Purdue University

5032: Creating an Automated Coaching Assistant: Implementing Technology to Assess Quality of Strength Training
Michael Clougher, Connecticut College

5033: Kea Music Player
Rains Jordan, The College of Saint Rose

5034: Accessibility of Windows on a Large Display
Danya Alrawi, Connecticut College

5035: Folders: a Visual Organization System for MIT App Inventor
Xixi Lu, Wellesley College

5036: An Autonomous Xpilot Agent
Brion Morrissey-Bickerton, Connecticut College

5037: Haptic Assistance Tool (HAT)
Elisabeth Fernandez and Jefferson Deng, Connecticut College

• • •

5038: Mobile Cloud Computing Frameworks: A Comparison
Corey Coughlin, Alexander Aroesty, Nicole Anderson and
Matthew Watrous, Roger Williams University

5039: Fun Interactive Pi-Robotic Projects for K-12
Maria del Mar Moncaleano, Mass Bay Community College

5041: Many Random Graphs are Expander
Yicheng Shao and Peter Reheis, Trinity College

5042: The Online Matching Problem
Maximilian Bender, Connecticut College

5043: Assessing Movement in DBS Parkinson's Patients
Courtney Pharr, Clark University

5045: iNodeKey: An Innovative Approach to Secure Your Data
Viet Le, William Putnam, Justin Labrecque, Michael Barone and
Chris Harris, University of New Haven

5046: CamelTours: Preserving Cultural Heritage by Technological Means
Julia Proft and Virginia Gresham, Connecticut College

5049: WooConnect
Abhijit Singh, Cyrus Fendorson, Hoang Nguyen, Joshua Cogswell and
Ronak Shah, Clark University

**5051: Scheduling Interface Generated and Managed by Undergrads for
Numerous Departments**
Rehan Rasool and Samuel Kovaka, Clark University

5052: Extending List Implementation in App Inventor
Soojin Kim, Wellesley College
5053: Paper Drums (Using Color Detection to Play Sounds)
Omar Waheed and Rehan Rasool, Clark University

5055: Physiological Responses to Immersion in Virtual Reality
Chris Glasz, University of Rhode Island

5056: An Immersive World for Research
James E Collins, Jr, University of Rhode Island

5057: Group Steiner Problem on the GPU
    Basileal Imana and Venkata Suhas Maringanti, Trinity College

5062: Exploring Natural Language Applications of Ternary Trees in Clojure
    David Siah, Kasia McLellan and Kent Wu, Villanova University

About the Keynote Speakers

Sep Kamvar is the LG Career Development Professor of Media Arts and Sciences, and director of the Social Computing group at the MIT Media Lab. His research focuses on social computing and information management. From 2003 to 2007, Kamvar was the head of personalization at Google. Prior to Google, he was founder and CEO of Kaltix, a personalized search company that was acquired by Google in 2003. He has been a consulting professor at the Institute for Computational and Mathematical Engineering at Stanford University.

Kamvar is the author of two books and over 40 technical publications and patents in the fields of search and social computing. He is on the technical advisory boards of several companies, and his artwork has been exhibited at The Museum of Modern Art in New York, the Victoria and Albert Museum in London, and the National Museum of Contemporary Art in Athens. Kamvar received his PhD in scientific computing and computational mathematics from Stanford University, and an AB in chemistry from Princeton University.

Kim B. Bruce is the Reuben C. and Eleanor Winslow Professor of Computer Science at Pomona College. Previously he was the Frederick Latimer Wells Professor of Computer Science at Williams College. He was instrumental in setting up and chairing computer science departments at both institutions.

His research has ranged from mathematical logic to programming languages to linguistics. He has been awarded numerous research grants from the National Science Foundation to support his research in programming languages and CS education. He has contributed to several national curricula in computer science. The author of numerous papers in programming languages and computer science education, he is also the co-author of an introductory textbook in Java and the author of a research monograph on the theory of object-oriented languages. In 2005 he was presented the ACM SIGCSE 2005 award for Outstanding Contributions to Computer Science Education.

Colleges Participating in the
2015 Programming Contest

Chestnut Hill College
Clark University
College of Staten Island
College of the Holy Cross
Connecticut College
Daniel Webster College
Fitchburg State
Framingham State University
Hamilton College
Massachusetts Bay Community College
Middlebury College
Pennsylvania College of Technology
Plymouth State University
Providence College
Saint Anselm College
Salem State University
Smith College
Southern Maine Community College
St. Lawrence University
SUNY Buffalo
SUNY Fredonia
SUNY Oneonta
SUNY Orange
The College of Saint Rose
Trinity College
University of New Hampshire at Manchester
University of New Haven
Villanova University
Wellesley College
Widener University
Worcester State

• • •

Reviewers

This conference is possible only because of the hard work of the entire community. CCSCNE gratefully acknowledges the following reviewers who assisted in selecting the panels, workshops, tutorials, lightning talks, and papers.

Sofya Poger,
Felician College

Sen Zhang,
SUNY Oneonta

Ying Liu,
St. John's University

Nadeem Hamid,
Berry College

Fred Martin,
University of Massachusetts Lowell

Rahman Tashakkori,
Appalachian State University

David Furcy,
University of Wisconsin Oshkosh

William Joel,
Western Connecticut State University

Jimmy Chen,
Salt Lake Community College

Warren Carithers,
Rochester Institute of Technology

Peter Drexel,
Plymouth State University

Matthew Hertz,
Canisius College

Eileen Peluso,
Lycoming College

Gurmukh Singh,
SUNY Fredonia

Robert Noonan,
College of William and Mary

Seth Freeman,
Capital Community College

John Slimick,
University of Pittsburgh at Bradford

Lucia Dettori,
DePaul University

John Dougherty,
Haverford College

Marc Waldman,
Manhattan College

Nanette Veilleux,
Simmons College

Jonathan Blake,
Quinnipiac University

Dan DiTursi,
Siena College

Linda Null,
Penn State University

Joan Lucas,
The College at Brockport

Yan Chen,
Borough of Manhattan
Community College, CUNY

• • •

Bradley Kjell,
Central Connecticut State University

Allen Tucker,
Bowdoin College

Lubomir Ivanov,
Iona College

Val Kolesnikov,
Manhattan College

Jeffrey Stone,
Penn State University

Susan Imberman,
College of Staten Island

Daniel Rogers,
The College at Brockport

Alice Fischer,
University of New Haven

Barbara Bracken,
Wilkes University

Deborah Hughes,
Lyndon State College

Andrea Lobo,
Rowan University

Christine Wania,
The College at Brockport

Karen Works,
Westfield State University

Christina Schweikert,
St. John's University

Christopher League,
LIU Brooklyn

Thambrahalli Rao,
The College at Brockport

Stefan Christov,
Quinnipiac University

Mark Hoffman,
Quinnipiac University

Lawrence D'Antonio,
Ramapo College

Delbert Hart,
SUNY Plattsburgh

Jalaa Hoblos,
Penn State University-
The Behrend College

Karl Wurst,
Worcester State University

See you next year for
CCSCNE 2016
Hamilton College
Clinton, NY
April 29 – 30