CCSCNE 2018

The Consortium for Computing Sciences in Colleges

In cooperation with

The Twenty-Third Annual
Consortium For Computing Sciences in Colleges
Northeastern Conference
April 20 - April 21, 2018 at

The University of New Hampshire at Manchester

CCSCNE 2018 Chair's Welcome

Welcome to Manchester, New Hampshire, and the University of New Hampshire, for the Twenty Third Annual Consortium for Computing Sciences in Colleges Northeast Region Conference.

Our program features two distinguished invited speakers, Professor Bill Manaris, College of Charleston, and Professor Colin Ware, University of New Hampshire The conference has a diverse and engaging program that includes paper presentations, lightning and encore talks, workshops, tutorials, and faculty and student research poster presentations. On Friday morning, we are hosting our traditional programming contest. Encouraged by the success of the student-focused sessions at last year's conference, on Friday afternoon we have added two student sessions to the career fair: a student “unconference” and a programming problems discussion session to allow participants and organizers of the programing contest to review and analyze problem solutions.

Our thanks go to a remarkable conference committee and highly invested board. Their inspiring and assiduous work has ensured the success of this conference. We are also very fortunate to have worked with dedicated and thorough reviewers, enthusiastic session chairs, and outstanding student and staff volunteers at UNH Manchester. The conference continues to be selective; we accepted 13 of 23 papers for an acceptance rate of 56%. This continues to ensure the high-quality program of a widely recognized regional conference.

We are pleased to be hosting this year’s conference at the UNH Manchester, the urban campus of University of New Hampshire, where students, faculty, business/industry, government, and nonprofits collaborate on mutually beneficial projects and initiatives.

We hope you find the conference informative and engaging, meet new colleagues, and get new ideas to contribute to computing education in Northeastern Region. If you are interested in volunteering for our conference, we encourage you to attend the CCSCNE Business Meeting on Saturday afternoon. We also look forward to seeing you next year at University of New Haven.

Michael Jonas and Mihaela Sabin, Conference Co-chairs
University of New Hampshire

We would like to thank our sponsors

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Conference Committee

Conference co-Chair, **Michael Jonas**, University of New Hampshire
Conference co-Chair, **Mihaela Sabin**, University of New Hampshire
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Lightning Talks Chair, **Joan DeBello,** St. John's University
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Tutorials co-Chair, **Ting Liu,** Siena College
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Faculty Posters Chair, **Daniel Rogers,** The College at Brockport
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Speakers co-Chair, **Mike Gousie,** Wheaton College (Massachusetts)
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Student Unconference co-Chair, **Andrea Murphy**, University of New Hampshire
Student Unconference co-Chair, **Jacob Aguillard**, Worcester State University
Encore Chair, **Darren Lim,** Siena College
Undergraduate Posters co-Chair, **Sandeep Mitra,** The College at Brockport
Undergraduate Posters co-Chair, **Alice Fischer,** University of New Haven
Undergraduate Posters co-Chair, **Karen Jin,** University of New Hampshire
Undergraduate Posters co-Chair, **Aparna Madhav,** Worcester State University
Registration co-Chair, **Mark Hoffman,** Quinnipiac University
Registration co-Chair, **Stefan Christov,** Quinnipiac University
Programming Contest co-Chair, **Frank Ford,** Providence College
Programming Contest co-Chair, **Del Hart**, SUNY Plattsburgh
Programming Contest co-Chair, **Mihaela Malita**, Saint Anselm College
Career Fair co-Coordinator, **Tim Chadwick,** University of New Hampshire
Career Fair co- Coordinator, **Melissa Lyon**, University of New Hampshire
Vendors Chair, **Tim Chadwick,** University of New Hampshire
Vendors Chair, **Kevin McCullen,** SUNY Plattsburgh
K-12 Coordinator, **David Benedetto,** University of New Hampshire

The Student Unconference, For Students by Students

Do you want to ...

- Discuss the programming contest problems and solutions?
- Demo your new favorite tool or programming language?
- Learn about new tools or programming languages?
- Discuss job interview questions?
- Talk about your favorite games?
- Present on a topic you are passionate about?

See Sessions 1D and 2D

CCSCNE 2018 Conference Program

Friday April 20

Registration (7:30 AM - 4:00 PM) **Student Commons**

Programming Contest (7:45 - 12:45 PM)

7:45AM	Continental Breakfast	Room 201
8:40AM	Pre-contest Instructions	Room 201
9:00AM	Contest	Rooms 142, 146, 149
12:00PM	Lunch and contest discussion	Room 201

Pre-conference Workshops (Friday April 20, 9AM - Noon)

Workshop 1 Room 302

Using PLCC To Implement Java Interpreters In A Programming Languages Course

Timothy Fossum, Rochester Institute of Technology

Workshop 2 Room 305

Real Live Data For CS Courses

Nadeem Abdul Hamid, Berry College

Workshop 3 Room 345

iCREAT: Introduction To Coding, Robotics, Electronics and Technology

Giuseppe Sena, Shamsi Mousavi, Marina Bograd, Susanne Steiger-Escobar, MassBay Community College

Workshop 4 Room 341

Injecting Cybersecurity Into a CS Program: A Non-specialist Perspective

David Voorhees, LeMoyne College

Aparna Da, LeMoyne College

Workshop 5 Room 307

NSF Proposal Writing (Vendor Workshop)

Paul Tymann The National Science Foundation and the Rochester Institute of technology

Welcome Address (1:00PM - 1:15PM) Room 201

Mike Decelle , Dean, UNH Manchester

Invited Speaker (1:15 PM - 2:15 PM) Room 201

Colin Ware, University of New Hampshire

Visual Queries, Visual Thinking and Data Visualization

The visual query is a basic component of all analytic seeing and understanding visual queries is an essential part of the design of information visualizations. Simply put, a visual query is a process whereby a problem is addressed through a pattern search. It is an analytic visual act of seeing. For example, the visual queries for finding routes on a road map involve discovering connected lines connecting two map locations. A visual query on a weather map might be as simple as discovering the temperature by matching a color to a temperature key, or as complex as understanding the pattern of winds at a weather front. This talk will give an overview of the way visual queries fit within the visual thinking process as well as a look at the how designs can be optimized with visual queries in mind.

Break (2:15 - 2:30) 1st Floor, 3rd Floor

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

Concurrent Session 1A (Papers) **Room 142**

Session Chair: Tim Fossum (RIT)

Teaching a Computer To Sing: Integrating Computing and Music In a Middle School, After-school Program

Jesse Heines, University of Massachusetts Lowell

Daniel Walzer, University of Massachusetts Lowell

The Tablet Game: An Embedded Assessment For Measuring Students' Programming Skill In App Inventor

Chike Abuah, University of Massachusetts Lowell
Diane Schilder, Evaluation Analysis Solutions
Mark Sherman, Massachusetts Institute of technology
Fred Martin, University of Massachusetts Lowell

Teaching Cybersecurity and Python Programming In a 5-day Summer Camp

Joshua Eckroth, Stetson University, Deland, FL

Concurrent Session 1B (Papers) **Room 146**

Session Chair: Lori Scarlatos (Stony Brook)

LEXOS 2017: Building Reliable Software In Python

Cheng Zhang, Wheaton College (Norton, MA)
Weiqi Feng, Wheaton College (Norton, MA)
Emma Steffans, Wheaton College (Norton, MA)
Alvaro de Landaluce, Wheaton College (Norton, MA)
Scott Kleinman, California State University Northridge
Mark LeBlanc, Wheaton College (Norton, MA)

Running a High School Programming Contest: a Distributed Approach. An encore presentation of Society for Information Technology & Teacher Education International Conference 2017 (https://www.learntechlib.org/p/177275/)

Michael Jonas, University of New Hampshire, Manchester, NH
Mihaela Malita, Saint Anselm College, Manchester, NH

A Hands-on Hardware-based Approach To Teaching Computer Science Concepts

Mark Gilder, The College of Saint Rose, Albany, NY
Judith O'Rourke, The College of Saint Rose, Albany, NY

Parallel Particle Swarm Optimization Can Solve Many Optimization Problems Quickly On GPUs

Erik Wynters, Bloomsburg University of Pennsylvania

Concurrent Session 1C (Tutorial) **Room 126**

Leveraging Emotional Intelligence (Soft Skills) To Maximize Career Success For Computer Science Students

Jami Cotler, Siena College, Albany, NY

Concurrent Session 1D - Student Unconference **Rooms 302, 305, 307**

Create your own Student Conference. Student-planned and student-led 30 minute sessions.

Session co-Chairs: Andrea Murphy (UNH), Jacob Aguillard (Worcester State)

2:30 - 3:00 Room 302 The group will collectively propose, develop, and vote on sessions.

3:15 - 3:45 First set of sessions (session 2D is second and third set)

Career Fair (2:30 - 5:00) Rooms 325/329

Break (3:45 - 4:15) 1st Floor, 3rd Floor

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

Concurrent Session 2A (Papers) **Room 142**

Session Chair: Ethel Schuster (Northern Essex Community College)

Guiding Principles and Pedagogical Tools for an Introductory Software Development Course. An encore presentation of 2017 ASEE Conference (https://www.asee.org/public/conferences/78/papers/20403/view)

Dr. Mark Hoffman, Quinnipiac University
Dr. Stefan C. Christov, Quinnipiac University

Embracing Coding Mistakes As a Method Of Teaching Computational Thinking

W. Scott Harrison, St. John Fisher College
Nadine Hanebutte

A Survey of Instructors' Experiences Supporting Student Learning using HFOSS Projects. An encore presentation from SIGCSE 2018 (https://dl.acm.org/citation.cfm?id=3159524)

Lori Postner, Nassau Community College, Garden City, NY
Heidi J. C. Ellis, Western New England University, Springfield, MA
Gregory W. Hislop, Drexel University, Philadelphia, PA

Concurrent Session 2B (Papers) **Room 146**

Session Chair: Choong-Soo Lee (St. Lawrence University)

Curriculum Changes To Improve Software Development Skills In Undergraduates
Brian O'Neill, Western New England University, Springfield, MA

A Flipped CS0 Classroom: Applying Bloom'S Taxonomy To Algorithmic Thinking. An encore presentation from CCSCNE 2014 (https://dl.acm.org/citation.cfm?id=2602731)
Namita Sarawagi, Rhode Island College, Providence, RI

DoodlePad: Next-Gen Event-Driven Programming For CS1. An encore presentation of CCSC:SC 2017 (https://dl.acm.org/citation.cfm?id=3055356)
Mark F. Russo, PhD, The College of New Jersey, Ewing Township, NJ

Concurrent Session 2C (Tutorial) **Room 126**

Cyber Criminology: An Interdisciplinary Approach In The Age Of Cyber Threat
Rajesh Prasad, Saint Anselm College, Manchester, NH
Liana Pennington, Saint Anselm College, Manchester, NH

Concurrent Session 2D - Student Unconference **Rooms 302, 305, 307**

Session co-Chairs: Andrea Murphy (UNH), Jacob Aguillard (Worcester State)
4:15 - 4:45 Second set of sessions
5:00 - 5:30 Third set of sessions

Poster Session (5:30 PM - 7:00 PM)

Faculty Posters **Room 201**

Student Posters **Student Commons**

Banquet and Awards (7:00 PM - 9:00 PM)

Manchester Downtown Hotel, 700 Elm Street, Manchester, NH

Saturday, April 21

Registration (7:30 AM - 10:00 AM) **Student Commons**

Continental Breakfast (8:00 AM - 9:00 AM) **Room 201**

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

Concurrent Session 3A (Papers) **Room 146**

Session Chair: Joshua Eckroth (Stetson University)

Checkpoints, Cloud and Collaboration (C3): A Learning Framework To Improve Learning Outcomes For International Students In Computer Science

Keith Bagley, Rivier University, IBM Research

Fostering Teamwork With An Online Idea Stock Exchange

Lori Scarlatos, Stony Brook University

Tony Scarlatos, Stony Brook University

A Freshman Seminar On Problem Solving And Algorithmic Thinking. An encore presentation from CCSCNE 2014 (https://dl.acm.org/citation.cfm?id=2602732)

Edmund A. Lamagna, University of Rhode Island, Kingston, RI

Concurrent Session 3B (NSF Vendor Presentations) **Room 142**

Session Chair: Michael Filippov (Rivier University)

Pencil Puzzles as a Gender and Experience-Neutral Context for CS 1/2 (an NSF Vendor presentation)

Zack Butler, RIT, Rochester, NY

Codelets, Epplets and Problets - Software tutors for introductory programming courses (an NSF Vendor presentation)

Amruth Kumar, Ramapo College, Mahwah, NJ

Concurrent Session 3C (Tutorial) **Room 126**

Computer Science and Robotics Using The Raspberry Pi, Arduino and Other SBCS

Kevin McCullen, SUNY Plattsburgh, Plattsburgh, NY

Michael Walters, SUNY Plattsburgh, Plattsburgh, NY

Invited Speaker (10:15AM - 11:15AM) Room 201

Bill Manaris, College of Charleston

Computing in the Arts: The Algorithm is the Medium

Algorithms have existed for at least 2,000 years (e.g., Euclid's algorithm). In music and art, algorithms appear as early as Guido d'Arezzo (ca. 1000 A.D.), and in compositions by Bach, Mozart, John Cage, Iannis Xenakis, among others. Modern examples include data sonification for scientific or aesthetic purposes, such as sonifying biosignals, images, orbits of planets, and human movement (e.g., dance), among others. This talk will focus on Computing in the Arts(CITA), an NSF-funded model curriculum, which combines creativity, problem solving, and computer programming to prepare students for graduate school and careers in technology and arts industries of the 21st century. CITA is part of the new movement to combine art and design with science, technology, engineering and math (STEM + Art = STEAM). Several examples will be presented, including:

- SoundMorpheus (an innovative interface for positioning sounds via arm movements);
- Diving into Infinity (a motion-based system which explores depictions of infinity in M.C. Escher's works); and
- JythonMusic (a programming environment for developing interactive music experiences and systems).

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

Concurrent Session 4A **Room 142**

Session Chair: Ziya Arnavut (SUNY Fredonia)

Scaling Up: Introducing Undergraduates To Data Science Early In Their College Careers

Jeremiah Johnson, University of New Hampshire

Engaged IT Experience Course to Enable the Future Workforce. An encore presentation of SIGITE 2017 (https://dl.acm.org/citation.cfm?id=3125694)

Rajesh Prasad Saint Anselm College, Manchester, NH, USA
Carol Traynor Saint Anselm College, Manchester, NH, USA
Adam Albina Saint Anselm College, Manchester, NH, USA

Dynamic Data Structures, a Web Based Tool For Teaching Linked Lists and Binary Trees

Robert Ravenscroft, Rhode Island College

Concurrent Session 4B (Lightning Talks) **Room 146**

Session Chair: Michael Black (Bridgewater State University)

Algorithm Impossible: A CS1 Algorithm Design Exercise

Benjamin Fine, Ramapo College of New Jersey, Mahwah, NJ

An Android Smartphone As IDE and Robot Controller

Richard Kline, Pace University, New York

Random Walks On Combs and Brushes: Undergraduate Research Project(S)

Alex Plyukhin, Saint Anselm College, Manchester NH

A First-year Experience Learning Community For Computer Science

Christian Roberson, Florida Southern University, Lakeland, FL

Supplemental Instruction: Leading To Success

Ethel Schuster, Northern Essex Community College, Haverhill, MA

Concurrent Session 4C (Tutorial) **Room 126**

Web Development With Node.Js Tutorial

Seikyung Jung, Bridgewater State University, Bridgewater, MA

Concurrent Session 4D (Vendor Presentations) **Room 102**

Session Chair: Karen Jin (UNH Manchester)

GitHub Classroom

Anisha Gupta and Elliot Whitehead, GitHub

An Introduction to Cloud Functions (a Google Vendor presentation)

Laurie White, Google (Professor Emeritus, Mercer University)

Membership Meeting (1:15 PM - 1:45 PM) **Room 142**

Board Meeting (1:45 PM - 3:45 PM) **Room 146**

The Keynote Speakers

Colin Ware, University of New Hampshire

Colin Ware has a special interest in applying theories of perception to the design of data visualizations. He has advanced degrees in both computer science (MMath, Waterloo), and in the Psychology of Perception (PhD,Toronto). He has published over 170 articles ranging from rigorously scientific contributions to the Journal of Physiology, Behavior and Vision Research to applications oriented articles in the fields of data visualization and human-computer interaction. His book *Information Visualization: Perception for Design* is now in its third edition. His book, *Visual Thinking for Design*, appeared in 2008. Ware also likes to build practical visualization systems. **Fledermaus**, a commercial 3D geospatial visualization system widely used in oceanography, was developed from his initial prototypes. His **trackPlot** software is being used by marine mammal scientists and his **flowVis2D** software is serving images on NOAA websites. Colin Ware is Director of the Data Visualization Research Lab which is part of the Center for Coastal and Ocean Mapping at the University of New Hampshire.

Bill Manaris, College of Charleston

Bill Manaris is Professor of Computer Science, and Director of the Computing in the Arts program at the College of Charleston. His areas of expertise include computer music, human-computer interaction and artificial intelligence. He explores interaction design, modeling of aesthetics and creativity, sound spatialization, and telematics. As an undergraduate, he studied computer science and music at the University of New Orleans, and holds M.S. and Ph.D. degrees in Computer Science from the University of Louisiana. He also studied classical and jazz guitar. Recently, he published a textbook *Making Music with Computers: Creative Programming in Python*. His research has been supported by the National Science Foundation, Google, IBM, the Louisiana Board of Regents, and the Stavros Niarchos Foundation.

Faculty Posters

Banerjee, S. and Mazur, N. *Service Learning in Computing: Creating Computer Science Pipeline by Attracting and Engaging High School Students*

Cupak, J. *Flipped Classroom in Teaching Computer Science*

Dancik, G. *Automated Grading of Template-Based R PRogramming Assignments Using Swirl-TBP*

Hislop, G., Ellis, H.J.C., and Jackson, H. *Student Contribution to HFOSS: Challenges and Opportunities*

Jin, K. H. *Students' Understanding of Basic Computational Concepts in an Introduction to Mobile Development Course*

McCullen, K. *Test Timings versus Scores: Who Finishes First?*

Riabov, V. *Computing Applications Enriched by Scientific Phenomena*

Roberson, C. *Techniques for Using Specifications Grading in Computer Science*

Shively, C., Banerjee, S., Mazur, N. *Intellectual Character: A Driving Force behind the Effective Teaching of the Advanced Placement Computer Science Principles Course*

Wynters, E. *C++ AMP Makes It Easy to Explore Parallel Processing on GPUs in a College Course or Research Project*

Zawicki, J., Banerjee, S., and Mazur, N. *Preparing Students for the First AP Computer Science Principles Exam: The Perspectives of CS Teachers*

We would like to thank our reviewers

John Boon, Hood College
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Joan DeBello, St. John's University
Dan DiTursi, Siena College
Alfreda Dudley, Towson University
Michael Filippov, Rivier University
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