CCSCNE '22

**The Twenty-Sixth Annual
Consortium for Computing Sciences in Colleges
Northeastern Conference**

April 1 – 2, 2022

**Hosted by Pace University
Pleasantville, New York**

CCSC

CONSORTIUM FOR
COMPUTING SCIENCES
IN COLLEGES

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**In Cooperation with the ACM Special Interest Group on
Computer Science Education (SIGCSE)**

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CCSCNE 2022 Chair's Welcome

We welcome you most enthusiastically to the Twentieth-Sixth Annual CCSC Northeastern Regional Conference at Pace University! It is so good to be able to meet together in person for the first time in three years.

The COVID pandemic has truly shaken up how we teach. Everyone has had to consider new ways of presenting material and keeping students engaged in an online or hybrid environment. While often difficult, these unusual circumstances have allowed many of us the chance to explore some of the promising new education technologies available today.

Throughout the roller-coaster ride of the past year, our CCSCNE board and conference committee members have been flexible and optimistic in their fantastic efforts to see this conference through. We are indebted to a diligent group of reviewers who have kept the conference program up to its usual standards. We are grateful for the wonderful support of Pace faculty, staff, and student volunteers in putting on this event.

All of our presenters have our sincere thanks for the work they have done in distracting times, and for their willingness to share it with us. There were 10 papers submitted, out of which 6 were accepted. This represents an acceptance rate of 60%. This year's program also includes works previously accepted at recent canceled or virtualized conferences. We look forward to our invited speaker, Amanda Holland-Minkley, and the opportunity to explore her work further in one of the conference sessions.

Finally, we thank everyone who has come to celebrate computer science education in person with us at this conference. We hope you find the experience rewarding, and that you come away with renewed enthusiasm for our field and your unique contributions to it.

CCSCNE 2022 Conference Co-Chairs
Rick Kline, Pace University
Lawrence D'Antonio, Ramapo College of New Jersey

CCSCNE 2022 Host

Pace University transforms the lives of its diverse students – academically, professionally, and socioeconomically. That mission is expressed in our motto: *Opportunitas*.

We serve our students from three locations in and around New York City. The New York City Campus is within walking distance to Wall Street and the Brooklyn Bridge, and a subway ride from all that the city has to offer. The 200-acre Pleasantville Campus is home to 14 NCAA Division II teams, and the Elisabeth Haub School of Law is situated in the heart of White Plains' buzzing suburban sprawl.

Founded in 1983, we are one of the first dedicated schools of computer science and information systems in the country. The Seidenberg School is so named in honor of Ivan G. Seidenberg, former chairman and CEO of Verizon Communications, Inc. who generously supported the School with the largest gift ever given to Pace University.

We are proud of our large and diverse student body, including 29% female students and 33% identifying as an ethnic minority. We currently have over 1,500 students pursuing degrees at the undergraduate, graduate and doctorate levels. Our newest programs include master's degrees in cybersecurity, data science, and human-centered design.

CCSCNE 2022 Conference Committee

Conference co-Chair, **Rick Kline**, Pace University
Conference co-Chair, **Larry D'Antonio**, Ramapo College of New Jersey
Program Chair, **Jim Teresco**, Siena College
Papers co-Chair, **Bonnie MacKellar,** St. John's University
Papers co-Chair, **Yana Kortsarts**, Widener University
Lightning Talks Chair, **Susan Imberman,** The City University of New York
Panels Chair, **Susan Imberman,** The City University of New York
Tutorials and Workshops co-Chair, **Joan DeBello**, St. John's University
Tutorials and Workshops co-Chair, **Ting Liu,** Siena College
Faculty Posters Chair, **Daniel Rogers,** SUNY Brockport
Speakers Chair, **Mike Gousie,** Wheaton College (Massachusetts)
Encore Chair, **Darren Lim,** Siena College
Undergraduate Posters co-Chair, **Sandeep Mitra,** SUNY Brockport
Undergraduate Posters co-Chair, **Alice Fischer,** University of New Haven
Undergraduate Posters co-Chair, **Liberty Page,** University of New Haven
Undergraduate Posters co-Chair, **Stefan Christov,** Quinnipiac University
Undergraduate Posters co-Chair, **Adita Kulkarni**, SUNY Brockport
Registration co-Chair, **Mark Hoffman,** Quinnipiac University
Registration co-Chair, **Rick Kline,** Pace University
Programming Contest co-Chair, **Frank Ford,** Providence College
Programming Contest co-Chair, **Del Hart**, SUNY Plattsburgh
Vendors Chair, **Kevin McCullen,** SUNY Plattsburgh

Host Site Committee

Jonathan Hill, Dean, Seidenberg School of Computer Science and Information Systems
Jill Olimpieri, Assoc. Director for Recruitment and Retention
Leanne Keeley, Web Developer and Coordinator, Blue CoLab
MaryAnn Errante, Asst. Director, University Special Events

CCSCNE 2022 Conference Program

The conference proceedings will appear in the ACM Digital Library as an issue of the Journal of Computing Sciences in Colleges (Vol. 37, No. 8). A draft of that issue is here.

Friday, April 1

Registration (7:30 AM - 4:00 PM)

Kessel Upper Lounge

Research Poster Setup (8:00 AM - Noon)

Kessel Upper Lounge

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

Register first at Main Registration		**Kessel Upper Lounge**
7:45AM	Continental Breakfast	**Willcox Friedman Rm**
8:40AM	Pre-contest Instructions	**Willcox Friedman Rm**
9:00AM	Contest	**Willcox CRC & 34**
12:00PM	Lunch and contest discussion	**Willcox Friedman Rm**

Pre-conference Workshop (9:00 AM - 12:00 PM)

Workshop   **Kessel Fishbowl**

Teaching with VS Code DevContainers
      Stoney Jackson, Western New England University
      Karl Wurst, Worcester State University

Attendees should bring a laptop to participate in the workshop. Attendees are encouraged to have VS Code, Git, and Docker installed before the

workshop. If you get stuck, come anyway. We'll try to help complete your installation. If not, we'll pair you with someone who has.
https://docs.docker.com/get-docker/
https://code.visualstudio.com/
https://git-scm.com/

Welcome to CCSCNE (12:45 PM - 1:00 PM)

Willcox Pecker Hall

Rick Kline, CCSCNE 2022 Co-chair, Pace University
Larry D'Antonio, CCSCNE 2022 Co-chair, Ramapo College of New Jersey
Jonathan Hill, Dean, Seidenberg School of Computer Science and
        Information Systems, Pace University

Invited Session (1:00 PM - 2:00 PM)

Willcox Pecker Hall

Session chair: Michael Gousie, CCSCNE 2022 Speakers Chair

Teaching Computer Science with a Liberal Arts Philosophy
Amanda Holland-Minkley, Washington & Jefferson College

Liberal arts colleges, and other institutions that follow a liberal education approach to undergraduate education, provide robust and compelling computer science education for their students. However, much of the discussion about computer science in the liberal arts is focused on the question of how smaller programs can still deliver a complete computer science education. With an established history of quality CS education taking place even in small programs, a more compelling question is: what can be learned from these programs that have allowed them to be successful and innovative despite these constraints? The review of a collection of model curricula shows that grounding curriculum design in a liberal arts philosophy inspires many programs to rethink what is essential. When this happens, common themes emerge: designing flexible pathways through the major, fostering interdisciplinary initiatives, and preparing students for a range of careers across their lifetime as well as their first

job. This talk will explore examples and suggest some lessons that could be applied to computing curriculum design at any institution. It is based on a paper, "CS Curricular Innovations with a Liberal Arts Philosophy", presented with James Teresco, Andrea Tartaro, Grant Braught, Jakob Barnard, and Douglas Baldwin at the SIGCSE 2022 Technical Symposium.

Break (2:00 PM - 2:15 PM)

Walk from Willcox Hall to Kessel Student Center

CCSC Partner Displays (11:00 AM - 5:30 PM)

Kessel Upper Lounge

Concurrent Session 1 (2:15 PM - 3:30 PM)

Concurrent Session 1A (Papers + Lightning Talk) Kessel Butcher
Session Chair: TBD

Cybersecurity Shuffle: Using Card Magic to Teach Introductory Cybersecurity Topics
> Preston Moore, New York University
> Justin Cappos, New York University

A Web-Based Toolkit for Exploring Cryptography[1]
> Mikel Gjergji, University of Rhode Island
> Edmund Lamagna, University of Rhode Island

Relating Discrete Mathematics to Information and Sciences Technology (Lightning Talk)
> Lawrence Dupak, Penn State University Greater Allegheny

Concurrent Session 1B (Tutorial)   Kessel Fishbowl

Python as a First Programming Language[2]
> Charles Dierbach, Towson University

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[1] This paper was presented virtually at CCSCNE 2021
[2] Encore presentation from CCSCNE 2014

Concurrent Session 1C (Special Session)   Kessel Gottesman Rm

Design Exercise for Creative Problem Solving
        Andreea Cotoranu, Pace University
        Dhruvil Gandhi, Pace University
This session is especially recommended for student attendees

Successful software design solutions must take into account end users' needs. This immersive exercise will allow participants to try out various tools in the design thinking process to better inform their decisions. Participants will work in pairs to find creative solutions to a given design challenge through human-centered design, rapid iteration and prototyping.

Break (3:30-4:00)   Kessel Upper Lounge

Concurrent Session 2 (4:00 PM - 5:15 PM)

Concurrent Session 2A (Papers + Lightning Talk) Kessel Gottesman
Session Chair: Kaleema, Pace University

Real-World Assignments at Scale to Reinforce the Importance of Algorithms and Complexity[3]
        Jason Strahler, The University of North Carolina at Charlotte
        Matthew Mcquaigue, The University of North Carolina at Charlotte
        Alec Goncharow, The University of North Carolina at Charlotte
        David Burlinson, The University of North Carolina at Charlotte
        Kalpathi Subramanian, The University of North Carolina at Charlotte
        Erik Saule, The University of North Carolina at Charlotte
        Jamie Payton, Temple University

Computer Science Case Studies from the Census
        Chris Healy, Furman University

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[3] This paper was originally accepted for presentation at the canceled CCSCNE 2020 conference.

Want your students to participate in Open Source? Join us in LibreFoodPantry! (Lightning Talk)[4]

> Stoney Jackson, Western New England College
> Karl Wurst, Worcester State University

Initial Research: How Does Instructor Identity Change Due to Supporting Student Involvement in Open Source Computing for Good? (Lightning Talk)

> Gregory Hislop, Drexel University
> Heidi Ellis, Western New England University

Concurrent Session 2B (Special Session)   Kessel Butcher
Session Chair: Jim Teresco

Innovations and Opportunities in Liberal Arts Computing Education

> Amanda Holland-Minkley, Washington & Jefferson College
> Grant Braught, Dickinson College

This is a hybrid (remote participation encouraged) followup session to a SIGCSE affiliated event organized by the SIGCSE Committee on Computing Education in Liberal Arts Colleges. Attendance at the SIGCSE session is not a prerequisite for attendance at this event.

Concurrent Session 2C (Tutorial)   Kessel Fishbowl

Computer Science and Robotics using Single Board Computers[5]

> Michael Walters, SUNY Plattsburgh
> Kevin McCullen, SUNY Plattsburgh

This session is especially recommended for student attendees

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[4] This lightning talk was originally accepted for presentation at the canceled CCSCNE 2020 conference.
[5] This tutorial was first presented virtually at CCSCNE 2021.

Concurrent Session 2D (Supporter Session)   Kessel Boudreau

Rephactor Supporter Session: The Online Textbook That You and Your Students Will Love
> Tom Way, Rephactor/Villanova University
> Peter DePasquale, Rephactor/New York University

Rephactor is an interactive and customizable online textbook for introductory Java and Python courses, with C++ on the way. In this session, discover Rephactor's next-level interactivity including the customizable syllabus builder, in-topic code explorer, auto-graded quizzes and exercises, and an instructor dashboard to analyze student progress, automate attendance tracking, download slides, and manage grades.

Reception and Poster Sessions (5:30 - 6:30 PM)

Faculty Poster Session   Kessel Upper Lounge

Undergraduate Poster Exhibit and Research Competition
**   Kessel Upper Level**

All poster titles and authors can be found on pages 16 – 18.

Banquet and Awards (6:45 - 8:15 PM) Kessel Gottesman Rm

Saturday, April 2

Continental Breakfast (8:00 AM - 8:45 AM)

Kessel Boudreau

Concurrent Session 3 (8:45 AM - 10:00 AM)

Concurrent Session 3A (Papers + Lightning Talk) Kessel Fishbowl
Session Chair: TBD

Content-Synchronized Game Development Modules in CS1

Xin Xu, Georgia Gwinnett College
Wei Jin, Georgia Gwinnett College
Hyesung Park, Georgia Gwinnett College
Evelyn Brannock, Georgia Gwinnett College
Adrian Heinz, Georgia Gwinnett College

Developing a Cross-Platform Mobile Course Using a Multi-Paradigm Framework

Alisa Neeman, Muskingum University

PDCunplugged: A free repository of unplugged parallel & distributed computing activities (Lightning talk)[6]

Suzanne Matthews, United States Military Academy

Concurrent Session 3B (Special Session)   Kessel Butcher
Motivating CS Majors Using Real-World Data, Games and Visualizations Using BRIDGES

Kalpathi Subramanian, The University of North Carolina at Charlotte
Erik Saule, The University of North Carolina at Charlotte
Jamie Payton, Temple University

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[6] Encore presentation of a lightning talk presented at SIGCSE TS 2021.

Concurrent Session 3C (Supporter Session)   Kessel Boudreau

Google Supporter Session: Using Cloud Computing Resources in Computer Science Classes

Mary Moore, Google Faculty Expert, West Virginia University, Potomac State College

Break and Membership Meeting (10:00 AM - 10:30 AM)

Kessel Boudreau

All members (if you registered for this year's conference, you're a member) are welcome to join the regional board and conference committee to share your thoughts about CCSCNE and find out more about the organization.

Mini Plenary Session (10:30 AM - 11:00 AM)

Kessel Fishbowl

About the ACM/IEEE-CS/AAAI Computer Science Curricula (CS202X)
Amruth N. Kumar, Ramapo College of New Jersey
Rajendra K. Raj, Rochester Institute of Technology

A Joint Task Force of the ACM, IEEE-CS, and AAAI is revising the undergraduate Computer Science curricular guidelines, which were last released as Computer Science Curricula 2013 (CS2013). This short plenary session will provide an update on work to date and plans moving forward. **Those interested in further discussion are encouraged to attend the special session Concurrent Session 4C.**

Concurrent Session 4 (11:15 AM - 12:30 PM)

Concurrent Session 4A (Papers + Lightning Talk)   Kessel Butcher
Session chair: William Tarimo

Instilling Conscience about Bias and Fairness in Automated Decisions

> Sheikh Rabiul Islam, University of Hartford
> Ingrid Russell, University of Hartford
> William Eberle, Tennessee Tech University
> Darina Dicheva, Winston-Salem State University

An Online Tool for Easy to Set up and Auto-gradable Full Tracing Exercises

> Wei Jin, Georgia Gwinnett College
> David Marshall, Georgia Gwinnett College
> Puen Xie, Georgia Gwinnett College

Dive into Systems: A Free, Online Textbook for Introducing Computer Systems (Lightning Talk)[7]

> Suzanne Matthews, United States Military Academy
> Tia Newhall, Swarthmore College
> Kevin Webb, Swarthmore College

Concurrent Session 4B (Workshop)   Kessel Boudreau
Introducing Agile in the Classroom

> Christelle Scharff, Pace University
> Henry Wong, Pace University

Concurrent Session 4C (Special Session)   Kessel Fishbowl
ACM/IEEE-CS/AAAI Computer Science Curricula (CS202X)

> Amruth N. Kumar, Ramapo College of New Jersey
> Rajendra K. Raj, Rochester Institute of Technology

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[7] Encore presentation of a lightning talk presented at SIGCSE TS 2021.

A Joint Task Force of the ACM, IEEE-CS, and AAAI is revising the undergraduate Computer Science curricular guidelines, which were last released as Computer Science Curricula 2013 (CS2013). This special session will present the work of the task force to date and solicit community feedback.

Board Meeting (12:45 PM - 2:30 PM)   Kessel Conf Rm A

Invited Speaker

Amanda Holland-Minkley is a professor in the Department of Computing and Information Studies at Washington & Jefferson College in Washington, Pennsylvania. Her research explores novel applications of problem-based and hands-on pedagogies to computer science education, both at the course and the curricular level, with a particular focus on interdisciplinary computing education. She is also engaged in undergraduate research, generally advising projects within information security and machine learning. She is a facilitating leader of the SIGCSE Committee on Computing Education in Liberal Arts Colleges.

Faculty Posters

Abstracts are included in the conference proceedings issue of JCSC (Vol. 37, No. 8) and can be found on our website (ccscne.org).

2022 Posters

E Iskrenova-Ekiert (SUNY Brockport), Jt Haag (2021 HIP Intern, HPC Internship Program, DoD High Performance Computing Modernization Program) and Soumya S. Patnaik (Aerospace Systems Directorate, US Air Force Research Laboratory). *Porting the Aircraft Power and Thermal Toolkit (APTT) MAGMA Tool to HPC Environment Using Singularity Containers: A Benchmark Study.*

Ching-Yu Huang (Kean University) and Janice Chao (High Technology High School). *A case study for a pilot data science curriculum for advanced high school students.*

Andres Arauz (Kean University) and Ching-Yu Huang (Kean University). *User experience and visualization of assistive technology devices.*

Felicia Hellems (Sacred Heart University) and Sajal Bhatia (Sacred Heart University). *Discovering Ways to Increase Inclusivity for Dyslexic Students in Computing Education.*

Undergraduate Student Posters

Poster abstracts are in a separate booklet, which can be found in the student poster area and on the conference website (ccscne.org).

Once Upon a Data Visualization: Visual Datasets for SimpleChartsRI, Sean Khang (Rhode Island College)

Picklr – A Job Scraping tool for Data Analytics of Programming Related Jobs, Michael Bonilla (Eastern Connecticut State University)

Interactive Linux BASH Script for the Aircraft Power and Thermal Toolkit (APTT) Sensitivity Analysis Tool: The BASH SA Tool, Tye Leckinger (SUNY Brockport)

Undergraduate Student Posters

Editing DEM Files to Represent Overhanging Structures and Arches, Hannah Lord (Wheaton College)

Experiences in Developing a Customized Software Application using Agile Methodologies with Extensive Customer Involvement, Kyle D. Adams, Matthew E. Morgan (SUNY Brockport)

Learning Arm Assembly Through a Binary Game and Dive Into Systems, D'Angelo M. Gourdine (United States Military Academy)

Are COVID-19 and H1N1-09 Pandemics covered differently?, Nathaniel Lichauco, Ziran Fei, Rachael Tovar, Kimberly Ekstrand (Wheaton College)

Text Summarization Tool Evaluation: A Study on Automatic Summarizing News Articles, Michael Foley, Andrei Gerashchenko, Rachael Tovar (Wheaton College)

Creating An Interactive Dashboard for Industry-Based Employment Data, Britney Bourassa (University of Massachusetts, Amherst)

InfinAI: NPCs Get Smarter, Brandon Olah, Anthony Radziunas, Joshua Bartholomew (University of New Haven)

Python & Private Variables, Joshua Bartholomew (University of New Haven)

Gesture Recognition and Lip Reading Through Computer Vision, Niko Severino (Connecticut College)

SmartPark, Benjamin Greenfield, Ben Placzek, Steven Atilho (University of New Haven)

AutoBot, Krystina Lorch (Felician University)

Gargoyle Guard: Real-Time User Activity Fingerprinting, Charles Barone, Orion Duffy, Alexander Russello (University of New Haven)

PharmBERT: a Pre-trained Language Model for Pharmaceutical Error Prediction, Dustin Doctor (SUNY Buffalo State)

Neural Network Learning Based on Visual Data, Evan Patterson (Champlain College)

Investigating Practices in Long Term Student Development, Gabriel Bick, Michael Lanners (University of the Pacific)

Undergraduate Student Posters

Intelligent Question Selection in Tutoring Software, Emerson Bieck (Ithaca College)

What Do Patients Value? : Using Natural Language Processing to Define a Good Doctor's Visit, Courtney Saqueton, Yash Karandikar (Occidental College)

Stance Prediction for Contemporary Controversial Issues, Mark Stowell (SUNY Brockport)

ScreenAware: an iOS App to Manage Problematic Smartphone Use, Zoe Beals (Skidmore College)

Redesigned UI and Spatial Data Structures for METAL Algorithm Visualizations, Bailey Cross, Luke Jennings, Spencer Moon (Siena College)

Unicon UI/IVIB Integration, Jonah Schnettler, Matthew Lane (SUNY Brockport)

Clustering for Community, Autumn Smith (Wellesley College)

Unicon HTTP Server, Stryder R. Coleman, Kyle Knopp, Daniel Cona (SUNY Brockport)

Parallelizing the RNA Secondary Structure Dynamic Programming Problem, Matilda Ferguson, Alice Huang, Katie Knox, Sojin Lim (Swarthmore College)

"Thinking" about the next generation of gaming, Christopher M. Howard, Jason Smith, Jim Durante (University of New Haven)

BERT-based Negotiation Chatbot, Matthew Clifford (SUNY Buffalo State)

Topic Modeling of Dark Websites on Tor Using Deep Neural Learning, Christopher Schmitt (Central Connecticut State University)

Multimodal Framework for Computational Musical Performance Analysis, Nikesh Ghimire (Connecticut College)

Automatic Sanitization of Computer Workstations using Computer Vision and UV-light, Yurock Heo, Zachary Beucler (Connecticut College)

Sensing the walking velocity of a person by using mobile devices, Anthony Smith (Winston-Salem State University)
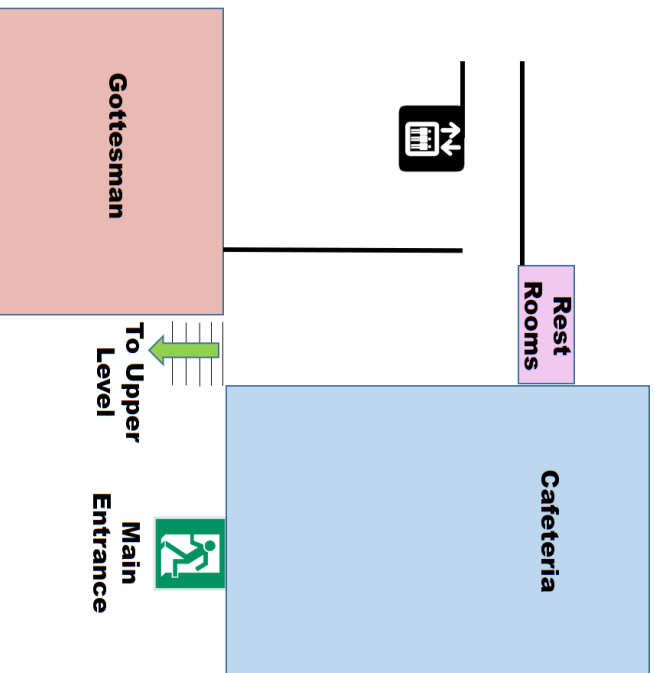
Thank You CCSCNE 2022 Reviewers

Chris Alvin, Furman University
Kailash Chandra, Pittsburg
Lawrence D'Antonio, Ramapo College
Jamie Davilla, UMass Amherst
Dan DiTursi, Siena College
Ryan Dougherty, United States Military Academy
Martin Gagne, Wheaton College
Michael Gousie, Wheaton College (MA)
Nadeem Hamid, Berry College
Delbert Hart, SUNY Plattsburgh
Erin Johnson, CodeCrew
Sotiros Kentros, Salem State University
Bradley Kjell, Central Connecticut State University
Daniel Krutz, Rochester Institute of Technology
Sriharsha Mallapuram, Plymouth State University
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Ingrid Russell, University of Hartford
Marc Waldman, Manhattan College

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Northeastern Region

CCSCNE '22   Kessel Student Center

Lower Level

Gottesman

Rest Rooms

Cafeteria

To Upper Level

Main Entrance

Upper Level

Butcher

Rest Rooms

Student Posters

To Lower Level

Registration

Poster Check-In

Lounge

Faculty Posters

CCSC Partners

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Fishbowl