The 5th Annual Conference on Integrated Computing and STEM Education

COMMON CORE MATH WITH COMPUTING & ROBOTICS:

PREPARING ALL STUDENTS FOR COLLEGE AND CAREER

Saturday, November 7, 2015
UC Davis Conference Center

UCDAVIS
C—STEM Center

About

Welcome to the 5th Annual Conference on Integrated Computing and STEM Education!

The conference provides a forum for K-14 STEM educators, researchers, policy makers and industrial partners to discuss and influence the future direction of integrated computing and STEM education.

This year's theme, "Common Core Math with Computing & Robotics: Preparing All Students for College and Career", is a reflection our goal to present how computer programming and robotics, in support of math instruction in alignment with Common Core, can help students achieve their college and career goals. This is in direct alignment with the Center's overarching goals:

- To close the achievement gap by broadening participation of students traditionally underrepresented in computing and STEM subjects

- To develop students' computer-aided problem-solving skills through engagement in real-world STEM problems.

Through this conference, we hope to inspire and further advance collaboration among K-14 teachers, researchers, policy makers and industry partners to continue our progress and achieve these goals.

The UC Davis Center for Integrated Computing and STEM Education (C-STEM) is hosting this important event in partnership with the California Department of Education and partner county offices of education. Funding is provided by the National Science Foundation.

Conference Planning Committee

Deborah Bruns, CaMSP C-STEM+ Project Director, Yolo County Office of Education
Harry H. Cheng, Professor and C-STEM Center Director, UC Davis
Heidi Espindola, C-STEM Program Manager, UC Davis
Ryan Mangan, C-STEM Education Specialist and Technology Coordinator, UC Davis
Halima Bishop, C-STEM Executive Assistant to Director and Finance Officer, UC Davis
Christina Morace, PRISM Project Director, Solano County Office of Education
Merry Kim, Coastline ROP, Orange County

Message from C-STEM Center Director

The successful implantation of the Common Core standards and the next Generation Science Standards hinges on the creation and integration of authentic, project-based learning experiences that require student to engage in real-world problem solving. Inspired by this challenge, the 5th annual Conference on Integrated Computing an STEM Education offers educators, researchers and policy makers the opportunity to learn more about integrated computing and STEM education and the strides many teachers have already made through the C-STEM Center.

The conference offers a first-hand opportunity to examine the ground-breaking work of the C-STEM Center on integrated computing and STEM education in formal, after school, and informal settings. Most recent work includes:

- UC Davis C-STEM has successfully created Integrated Math 1 and Algebra 1 with Computing and Robotics courses with UCOP category C designations.

- The Center's partnership with Barobo has helped produce the new LinkbotLabs robotics software, an advancements in how students interact with robotics platforms.

- RoboBlockly, developed as a free, web-based integrated development environment (IDE) for programming Linkbots, was designed for beginners to learn coding and math with robotics.

- C-STEM Studio was created as a platform for educators to teach C-STEM, allowing easy access to all software components.

- Since 2013, the UC Davis Center for Integrated Computing and STEM Education, in coordination with young college and high school women, has been encouraging young girls to take more leadership roles in STEM fields using robotics-based curriculum with a Girls Leadership Camp.

During the Conference we will be recognizing outstanding STEM teachers and administrators with C-STEM Teacher of the Year Award and the C-STEM Administrator of the Year Award, for their exceptional contributions in integrating computing into STEM subjects, and inspiring students to pursue career and post-secondary study in C-STEM fields.

Join us in meeting the challenge of closing the achievement gap, and preparing all students to be college and career-ready.

-- Harry H. Cheng

Conference Highlights

- Keynote Address on **"The landscape of STEM: a perspective from the California Department of Education"** by **Carrie Roberts**, Director of Professional Learning, California Department of Education

- Lunch Address on **"The Next Classroom: Inspiring Minds and Changing Lives Beyond the 21st Century"** by **Tracy Saville**, Founder/CEO, Queentia/My Swirl

Keynote Speaker

Carrie Roberts
Director of Professional Learning
California Department of Education

8:40 - 9:00 AM
"The landscape of STEM: a perspective from the California Department of Education"

Carrie Roberts is currently the Director of the Professional Learning Support Division at the California Department of Education. She has served as the Administrator and an Education Programs Consultant in the Literacy, History, and Arts Leadership Office in the Professional Learning Support Division. She earned an undergraduate degree in Liberal Studies and a graduate degree in Language and Literacy from California State University, Sacramento. She also holds a Multiple Subjects Teaching Credential, Reading Specialist Credential, CLAD Credential, and Clear Administrative Credential. Before her tenure at the CDE, she was a Reading Specialist and elementary school teacher in the Eureka Union School District for 15 years.

Lunch Speaker

12:10 - 1:10 PM
"The Next Classroom: Inspiring Minds and Changing Lives Beyond the 21st Century"

Tracy Saville
Founder/CEO
Queentia/My Swirl

As visionary and founder of My Swirl, the disruptive community, collaboration, and productivity app for women worldwide due in 2016, Tracy is a technology 'imagineer', executive leader, and sales and marketing veteran with more than 25 years of public and private experience, working always in innovation or change-making.

Prior to My Swirl, Tracy served as VP of Marketing for CleanWorld, a leader in anaerobic digestion technology, and she is also currently the advising CFO and co-founder of a building products company. As a lifelong entrepreneur and policy leader, she served in key influence roles during the administrations of California Governors Pete Wilson and Gray Davis, and subsequently founded and developed companies in leadership development, entertainment, publishing, renewable energy technology, and mobile software.

Tracy holds a BA in Management, an MFA in Writing, a Negotiations Certificate for Senior Executives from the joint certificate program administered by Harvard Law School, MIT, and Tufts University, and was a participant of West Point Military Academy's Global Leadership summit in 2011. She has advised for Angel Hack, Social Venture Partners, Women's Start-up Weekend, and TEDx Sacramento. She also advises and is an adjunct instructor for California State University Continuing Education programs.

Conference Sessions

A. Closing the Gender Gap: Engaging female students through Girls In Robotic Leadership Camps (GIRL Camps)

E **M**

The C-STEM GIRL Camps are focused on motivating girls in middle school through peer mentoring to learn computing and STEM concepts through a fun and exciting robotics-based curriculum culminating in the creation of a C-STEM Day RoboPlay Video. Come list to how this leadership camp will enable them to serve as leaders and inspire other young girls to gain interest in science and technology through near peer mentoring and collaborative and creative activities.   GIRL Camps are funded by various sponsors and free for camp participants.

Session 2
Conference Room A

B. Best Practices and Lessons Learned: C-STEM School, District, and County-wide Implementation

A

Administrators of all levels are encouraged to attend this session to hear how the C-STEM program can be implemented in schools and districts. 2013/2014 was the first year C-STEM was implemented district wide and the first year C-STEM Day was held outside of UC Davis through a county wide pilot in Orange County. Community college, county office, district and school site educators will describe their experience from starting their projects with initial interest to teacher training, class implementation, teacher support, and the culminating event C-STEM Day. Funding sources and coordination between existing STEM/CTE efforts will be discussed.

Session 2
Ballroom B

C. RoboBlockly: Engaging students in computing, robotics and math*

E **M** **B**

Come see C-STEM's latest online project! RoboBlockly is a web-based robot integrated development environment (IDE) for programming Linkbot and Lego Mindstorms NXT/EV3 based on Google's Blockly. RoboBlockly is designed for beginners to learn coding and math with robots. All math activities in RoboBlockly are Common Core State Standards Mathematics compliant. RoboBlockly prepares students ready to program in C/C++, the most widely used conventional text-based language in industry and college. Students can share your ideas and creations with others using the saved RoboBlockly blocks in the on-line community. RoboBlockly can run in any modern browser, without installation of any software, independent of operating system and device. It supports Web browsers IE, Edge, Firefox, Chrome, Safari, in platforms of desktops, tablets, and smartphones with Windows, Mac, iOS, Android, etc.

RoboBlockly iPads, Tablets, and Chromebooks are acceptable in addition to Windows and Mac OS devices (only for this session)

Session 1, 2 & 3
Ballroom A

D. Intro to the C-STEM Program: The What, When, Where, Why and How

E M H A

New to C-STEM? Come hear about what the Center has to offer for students, teachers, schools, districts and county offices of education. Topics will include current C-STEM developed technology, curriculum, research, professional development, and student events, including the annual C-STEM Day and summer camps, as well as future expansion goals of the center.

Session 1
Conference Room A

E. RoboPlay Challenge Competition in Action!

E M H B

Join our mini C-STEM Day RoboPlay Challenge Competition! See what your students would experience this May 28th! Participants will be given mini challenges and compete in 10 minute rounds. As participants prepare with their team, observers will be given an overview of the format and expectations of the competition. When our mini competition begins, observers will interact with the teacher teams, witnessing the successes and challenges students will face. Teacher team participants must bring their own laptop (Windows XP or Mac OS 10.7.5 or higher laptop) with software pre-loaded. Teacher team participants must have attended a prior C-STEM training with Linkbot. Tea will be formed on the spot.

Session 2 & 3
Alumni Center
Alpha Gamma Rho

F. Middle School Math: Enhancing CCSS through C-STEM

M B

Come hear how a panel of Middle School Math teachers have incorporated C-STEM curriculum in their Math 6,7,8 classes to develop and expand students' understanding and application of mathematics content and Standards for Mathematical Practice. Panelist will actively engage the audience in specific lessons and outcomes where students analyze real life situations, identify given information, formulate mathematical steps to find a solution, and analyze the results for accuracy, all within the context of computer programming. Teachers will also share how their students are motivated to collaborate on critical thinking activities based on algebraic topics while developing their ability to effectively communicate, listen, share responsibility and respectfully address the suggestions of others. Participants are encouraged to bring their own Windows or Mac OS X laptops with software pre-loaded and to have attended a prior C-STEM training in order to fully participate in this session.

Session 1 & 3
Ballroom B

G. Integrated Math 1&2: Starting an Integrated Approach in High School Math

H **B**

Observe or participate in an Algebra 1 / Integrated Math 1 programming lesson! Come see what your students would experience through C-STEM as participants complete differentiated programming tasks that attend to specific mathematics objectives.   Teaching resources such as power-points, group activities and robotics activities are presented to showcase how computer programming can support math instruction in alignment with Common Core and current teachers discuss how specific lessons have impacted their students. Participants are encouraged to bring their own Windows or Mac OS X laptops with software pre-loaded and to have attended a prior C-STEM training in order to fully participate in this session.

Session 1 & 2
Conference Room B

H. Tools/Strategies for C-STEM Classroom Instruction, Management and Assessment

B **E** **M** **H** **A**

Have you wondered what type of pedagogy, instructional strategies and management/ assessment tools would help your C-STEM implementation be more effective? Come listen to a group of teachers discussing what they do in their classroom and what technology tools make their lives easier!

Session 3
Ballroom C

I. Outside the Classroom: Integrating C-STEM in After School Education

E **M** **H**

After school programs and clubs allow students to explore material that can't be covered in the traditional 8-3 school day. C-STEM curriculum provides students with academic rigor while also enriching collaborative and 21st century skills. This session will delve into the available resources which attract underrepresented groups into STEM field, including standards based extension activities which allow for preparation for the C-STEM Day Competition and provide support for core classes.

Session 1
Alumni Center
Alpha Gamma Rho

J. Digital Media and Language Arts: C-STEM RoboPlay Video Competition

E **M** **H**

Incorporating digital media and language arts is an enticement for many students to participate in STEM activities, as many students are not initially attracted to STEM because of preconceptions regarding the field. Experienced teachers will show winning C-STEM Day videos and take you through key steps of a robotic video creation, illustrating the

Session 3
Conference Room A

connection between English language arts, digital media and traditional STEM subjects. Best practices, successes and challenges will be shared from plot conception, story and character development, choreography, soundtrack, robotic programming and 3D design, video production and editing.

K. Middle School ICT Pathways: Kindling their passion for computing!

M **B**

Research has shown the importance of attracting students to STEM in middle school. A panel of teachers will discuss the ways they have engaged their students, specifically female and unrepresented groups, inspiring them to go on to higher level STEM courses and become motivated to pursue STEM in college and in careers.

Session 1
Ballroom C

L. High School ICT Pathways: Expanding Students Expertise

H **B**

In this session, a panel of CTE/ROP teachers and administrators discuss their experience through C-STEM elective computing and robotics courses. These educators will discuss the key skills that K-12 educators should emphasize to ensure their students will be competitive in today's careers, how to integrate those through C-STEM standards based curriculum, and ways of building partnership with industry to bring industry expertise and role models into the classroom. They will describe how they see C-STEM curriculum fulfilling that need as well as what improvements still need to be made in CTE/ROP courses and pathways.

Session 3
Conference Room B

M. The Science Connection: C-STEM and NGSS

M **H**

NGSS has changed the way science, technology and engineering intersect, providing a wealth of opportunities to engage students in science through computing and robotics. A panel of science teachers will discuss the science standards and topics where they have included C-STEM as well as the learning and student development goals that they have seen growth in because of this integration.

Session 2
Ballroom C

Key

E Appropiate for Elementary School Teachers

A Appropiate for Administrators

M Appropiate for Middle School Teachers

B BYOD – Bring your own Device (Windows XP or higher or MAC OS10.7.5 or higher unless specified

**H** Appropiate for High School Teachers

Conference Schedule

Time	Event	Location
8:00 - 8:30 AM	Registration and Continental Breakfast	Conference Center Lobby
8:30 - 8:40 AM	Welcome and Introductions • Dr. Harry H. Cheng, Professor and C-STEM Center Director and Dean of the College of Engineering, UC Davis • Dr. Jennifer S Curtis, Dean of the College of Engineering, UC Davis	Conference Center Ballroom A, B, C
8:40 - 9:00 AM	Keynote Address: "The landscape of STEM: a perspective from the California Department of Education" • Carrie Roberts, Director of Professional Learning, California Department of Education	Conference Center Ballroom A, B, C
9:00 - 9:20 AM	Plenary Address: • Dr. Harry H. Cheng, C-STEM Center Director and Professor, UC Davis	Conference Center Ballroom A, B, C
9:20 - 9:40 AM	Award Presentation: • C-STEM Teacher of the Year Award • C-STEM Administrator of the Year Award Presenters: • Dr. Harry H. Cheng, C-STEM Center Director and Professor, UC Davis • Dr. Jennifer S Curtis, Dean of the College of Engineering, UC Davis	Conference Center Ballroom A, B, C
9:40 - 9:55 AM	Coffee Break	Conference Center Lobby
9:55 - 10:55 AM	**Breakout Session 1**	
	C. RoboBlockly: Engaging students in computing, robotics and math Presenters: • Kayce Mastrup, UC Davis • Carmen Wright, Elkhorn Village Elementary, WUSD	Ballroom A
	D. Intro to the C-STEM Program: The What, When, Where, Why and How	Conference Room A

Time	Event	Location
	Presenters: • Heidi Espindola, C-STEM Center, UC Davis • Francesca Reinhart, Smedberg Middle School, EGUSD	
	F. Middle School Math: Enhancing CCSS through C-STEM Chair: Christina Morace, Project Director, Solano County Office of Education Presenters: • Josh Baskin, Lee Middle School, WJUSD • Jessica Fernandez, Glen Edwards Middle School, WPUSD • Jess Graves, Douglas Middle School, WJUSD • Ryan Smith, Glen Edwards Middle School, WPUSD • Brian Speck, Jepson Middle School	Ballroom B
	G. Integrated Math 1&2: Starting an Integrated Approach in High School Math Chair: Deborah Bruns, Project Director, Yolo County Office of Education Presenters: • Kirsten Tomko, Armijo High School, FSUSD • Anthony Nanfito, Armijo High School, FSUSD • Clay Dagler, Luther Burbank High School, SCUSD	Conference Room B
	I. Outside the Classroom: Integrating C-STEM in After School Education Chair: Zhe Chen, Professor, UC Davis Presenters: • Tammy Lee, American Canyon Middle School, NVUSD • Yasmin Henry, Sutter Middle School, SCUSD	Alumni Center Alpha Gamma Rho
	K. Middle School ICT Pathways: Kindling a passion for computing! Chair: Patrick Bohman, Vice Principle, School of Engineering and Sciences, SCUSD Presenters: • Krista Purdom, Dixon Montessori, DUSD • Mark Lyon, Albert Einstein Middle School, SCUSD	Ballroom C
10:55 - 11:10 AM	Coffee Break	Conference Center Lobby

Time	Event	Location
11:10 AM - 12:10 PM	**Breakout Session 2**	
	A. Closing the Gender Gap: Engaging female students through Girls In Robotic Leadership Camps (GIRL Camps) Chair: Dr. Maria Armstrong, Woodland Joint USD Presenters: • Muntaha Samad, UC Davis • Shauna Hawes, Valley View Middle School, MDUSD	Conference Room A
	B. Best Practices and Lessons Learned: C-STEM School, District, and County-wide Implementation Chair: Alisa McCord, STEM/CTE Partnership Coordinator, Orange County Department of Education Presenters: • Deb Bruns, C-STEM+ Project, YCOE • Christina Morace, PRISM Project, SCOE • Merry Kim, Irvine Valley College • Nita Tewari, Parent, CDM High School Club Robotics, NMUSD • Ellie Campbell, Parent, CDM Middle & High School Foundation, NMUSD	Ballroom B
	C. RoboBlockly: Engaging students in computing, robotics and math Presenters: • Kayce Mastrup, UC Davis • Loretta Perez, Elk Grove High School, EGUSD	Ballroom A
	E. RoboPlay Challenge Competition in Action! Panelists: • Ryan Mangan, UC Davis • Dubarrie Fagout, River City High School, WUSD	Alumni Center Alpha Gamma Rho
	G. Integrated Math 1&2:Starting an Integrated Approach in High School Math Chair: Sheryl Ryder, Executive Director, Placer County Office of Education Presenters: • Sarah Melanephy, Rodriquez High School, FSUSD • Katie Kilts, Rodriquez High School, FSUSD • Clay Dagler, Luther Burbank High School, SCUSD	Conference Room B

Time	Event	Location
	M. The Science Connection: C-STEM and NGSS Chair: Clark Bryant, Associate Superintendent, Davis Joint USD Panelists: • Mafe Aguilar, California Middle School, SCUSD	Ballroom C
12:10 - 1:10 PM	Lunch Featured Speech: **"The Next Classroom: Inspiring Minds and Changing Lives Beyond the 21st Century"** • Speaker: Tracy Saville, Founder/CEO, Queentia/My Swirl	Conference Center Ballroom A, B, C
1:10 - 2:10 PM	**Breakout Session 3**	
	C. RoboBlockly: Engaging students in computing, robotics and math Presenters: • Kayce Mastrup, UC Davis • Trecia Ogino, Elkhorn Village Elementary, WUSD	Ballroom A
	E. RoboPlay Challenge Competition in Action! Presenters: • Ryan Mangan, UC Davis • Kim Stowell, Albert Einstein Middle School, SCUSD	Alumni Center Alpha Gamma Rho
	F. Middle School Math: Enhancing CCSS through C-STEM Chair: Mary-Betty Stevenson, Program Director, UC Davis Panelists: • Peter Fuentes, James Rutter Middle School, EGUSD • Lauren Arthofer, Douglas Middle School, WJUSD • Francesca Reinhard, TR Smedberg Middle School, EGUSD	Ballroom B
	H. Tools/Strategies for C-STEM Classroom Instruction, Management and Assessment Chair: Brian Donnelly, Executive Director, OC Pathway, Orange County Department of Education	Ballroom C

Time	Event	Location
	Presenters: • Melissa Hale, Consumnes Oaks High School, EGUSD • Krista Purdom, Dixon Montessori, DUSD • Judy Tan, River City High School, WUSD	
	J. Digital Media and Language Arts: C-STEM RoboPlay Video Competition Merry Kim, Projects Director, Irvine Valley College Panelists: • Gavin Williams, Luther Burbank High School, SCUSD • Yasmin Henry, Sutter Middle School, SCUSD	Conference Room A
	L. High School ICT Pathways: Expanding Students Expertise Chair: Gary Page, Education Programs Consultant, California Department of Education Panelists: • Paul Akuna, Franklin High School, EGUSD • Buck Young, Pleasant Grove High School, EGUSD • Mike Challender, Winters High School, WJUSD	Conference Room B
2:10 - 3:00 PM	Networking	Alumni Center Moss Garden
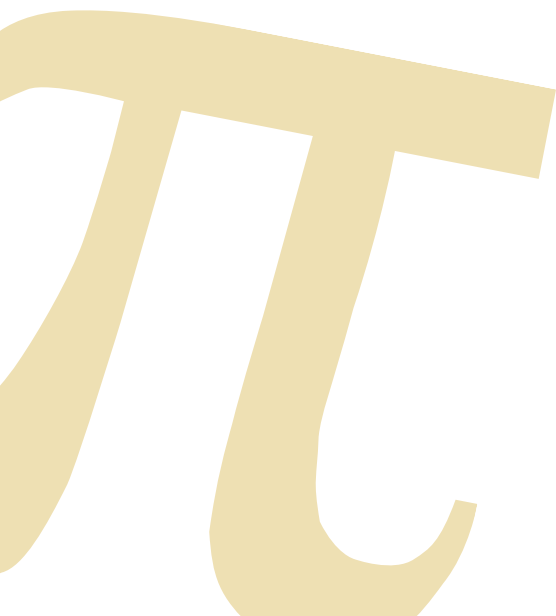
C-STEM Teachers of the Year

Judy Tan
River City High School

Jada Saul
Riverbank Elementary

Jeremy Waddell
Granite Oaks Middle School

Kim Stowell
Albert Einstein Middle School

Mark Lyon
Albert Einstein Middle School

Peter Fuentes
James Rutter Middle School

Shauna Hawes
Valley View Middle School

Peter Selby
Corona del Mar High School

Administrator of the Year Award

Deborah Bruns
Yolo County Office of Education

Michael Vossen
Director of College and Career Education, Newport-Mesa Unified School District

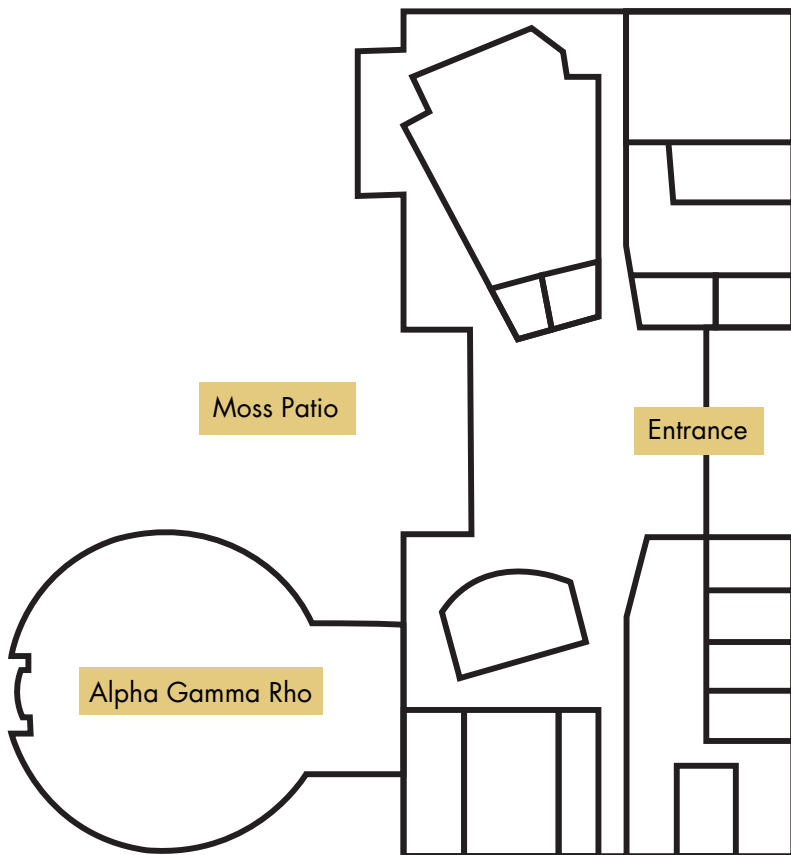# Conference Parking & Building Location

✳ (cyan)	Walter A. Buehler Alumni Center
✳ (yellow)	Conference Center
✳ (red)	Parking

Maps

Walter A. Buehler Alumni Center

Moss Patio

Entrance

Alpha Gamma Rho

UC Davis Conference Center

Ballroom C

Ballroom B

Ballroom A

RESTROOM

Registration/ Information

Conference Room B

Conference Room A
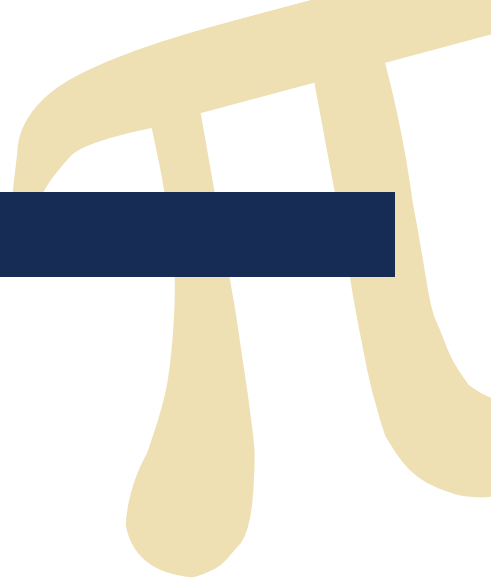
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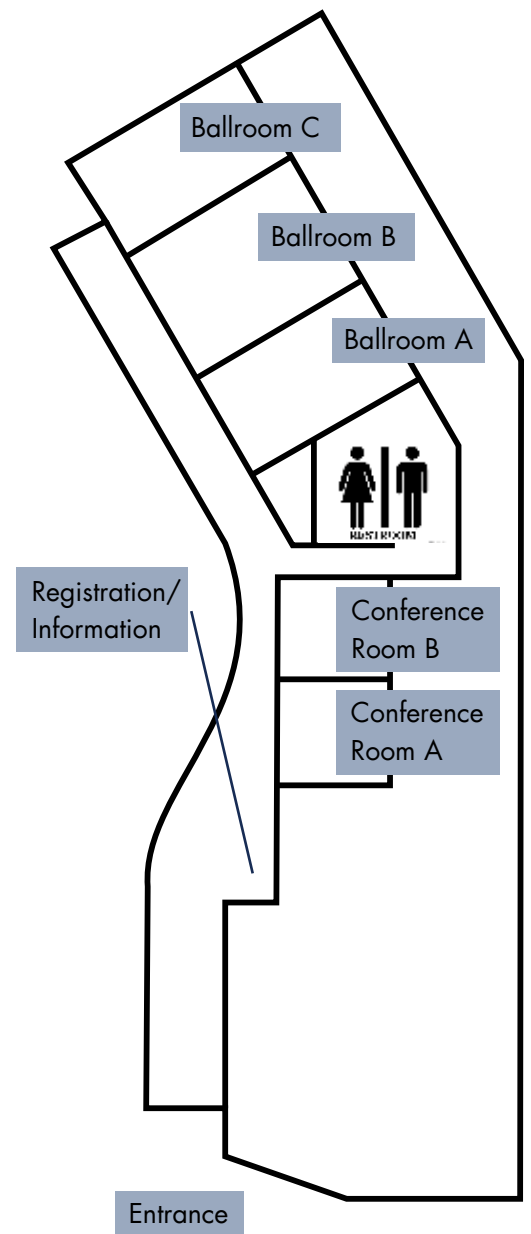
Notes

Notes

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