

UCLA DEPARTMENT OF MATHEMATICS

# 2020 Mathematics & Teaching Conference

MARCH 7, 2020



# WELCOME!

We enthusiastically welcome you to the 12th UCLA Mathematics Department's Philip C. Curtis Jr. Center for Math and Teaching Conference! During this day of meaningful and relevant talks by current teachers, research mathematicians and mathematics educators we will work together to improve the mathematical experiences of all K-12 students.

Warm wishes,  
Heather Dallas  
Executive Director

## THE UCLA CURTIS CENTER

The UCLA Curtis Center is a group of K-12 and university mathematics enthusiasts who work together to improve the quality of K-12 mathematics activity.

Currently, we work to:

- Provide effective opportunities for K-12 teachers to deepen their understanding of the mathematics they teach, extend their knowledge of mathematics, and learn how to apply their mathematical knowledge to the work of teaching.
- Provide effective training of undergraduates for careers in mathematics teaching and mathematics teacher leadership.
- Write mathematics curriculum for use in K-12 mathematics classrooms that engages students in sense making, justification and application of mathematics.
- Develop mathematics assessments focused on problem solving, communicating reasoning, and application of mathematics in order to promote student readiness for college mathematics courses, careers and in life
- Provide high quality mathematics activities for students in local schools to give them a view of mathematics as a creative reasoning and problem solving activity with intrinsic beauty and meaningful application.

## THE UCLA SITE OF THE MATHEMATICS DIAGNOSTIC TESTING PROJECT (MDTP)

MDTP is a joint CSU/UC project that develops diagnostic and written response assessments designed to measure students' preparedness for mathematics course work from grades six to calculus. MDTP assessments are purposefully developed and validated by MDTP Workgroup members which include faculty from CSU, UC, community colleges, and secondary schools. Teachers are supported by eight regional MDTP sites located at CSUs and UCs. MDTP site directors and staff assist teachers to access and administer MDTP online and paper testing and offer local data workshops and training to interpret and use MDTP diagnostic data formatively, all free of charge. The MDTP Assessment System helps teachers and students focus on topics, skills, and conceptual understanding support students to succeed in learning collegiate mathematics. The UCLA MDTP site serves Los Angeles and Ventura counties.

**BREAKFAST & REGISTRATION • 8-9AM • BALLROOM PREFUNCTION AREA**



## Dr. Marcus Roper

Professor, UCLA Mathematics Department

### USING MATH TO MAKE SENSE OF OUR WORLD

MATHEMATICS • GRADES K-12 • BALLROOM C

Some of the most frequently-asked questions by K-12 mathematics students are: Does anyone actually use mathematics in the real world? What do mathematicians actually do? Are people still discovering new mathematics? I will help you to answer these questions by showing how my group is using math to discover and shape the world around us, including how to design devices for analyzing trace amounts of chemicals, learning how many unsheltered homeless live in LA and understanding how our blood vessels work. I will also introduce you to some of the people, including teachers and teachers-in-training who have contributed to these discoveries.

Then I will tell you the story of how a discovery is made, by explaining the process that led us to realize how fungi solve traffic jams. We all hate sitting in traffic, yet it feels unavoidable: Human highways are built to have a maximum capacity of cars that they can carry. When the number of cars exceeds this capacity, we end up sitting in traffic jams. In my research group, we studied how fungi build tiny highways to transport fluid and nutrients. We discovered that these highways actually get faster the more traffic they carry. To understand how, we found surprising connections between the math describing fungal traffic and the growth of waves on the ocean.

*Professor Marcus Roper received his Ph. D. in mathematics from Harvard University and joined the UCLA Mathematics Department in 2010. In addition to teaching mathematics, he conducts research in mathematical problems coming from physics and biology. He is particularly interested in fungal mycelia, the microvascular system and design and optimization of inertial microfluidic devices.*

*Marcus has collaborated with The Curtis Center by editing mathematics and physical science lessons written by teachers in the Center's California Math Science Partnership Grant with Glendale Unified, editing K-12 lessons written for use with Magformers, a magnetic polygons used as concrete models in instruction, as well as speaking to teachers about current mathematical research. In addition, Marcus supports the development of future teachers by serving as the advisor to undergraduate math majors studying to be future high school teachers as they engage in summer research in applied mathematics.*

## AM BREAKOUT SESSIONS • 10:10-11:20



### Kelly Ann Sassone

Teacher, Da Vinci Schools

#### MAKING SENSE OF FRACTIONS

PEDAGOGY • GRADES K-3 • ENLIGHTENMENT ROOM

The foundation of fractions begins well before the term “fraction” appears in the standards. Early elementary students begin this exploration through engagement with the geometry standards. With intentional planning and a deep understanding of the progression of the geometry standards, teachers can facilitate learning that allows even our youngest learners to actively construct meaning and make sense of fractions.

*Kelly Ann Sassone currently teaches kindergarten at Da Vinci Connect. As a literacy specialist, elementary math specialist, lead math teacher, and BTSA mentor; she has supported new and veteran teachers in their professional growth. She has presented at CMC conferences, CCSA conferences, the California Kindergarten Association Conference, and the Southern California Kindergarten Conference. She earned her bachelor's degree and teaching credential from San Diego State University. She earned her administrative credential and Master in Educational Administration from CSUDH.*



### Mike Nakamaye

Professor in Residence, Illustrative Mathematics

#### Deborah Peart

Grade 2 Lead Writer with Illustrative Mathematics



#### THE NUMBER LINE IN K-5 MATHEMATICS

PEDAGOGY • GRADES K-5 • OPTIMIST ROOM

We will look at the work of K-1 which helps build an understanding for and appreciation for the number line, then examine how it is introduced in grade 2, and then used to support student learning of arithmetic and geometry in grades 3 through 5. Then we'll pick a variety of activities from the new Illustrative Mathematics K-5 Curriculum for participants to work on in order to better appreciate how the idea of a number line and its structure steadily develops throughout the curriculum.

*Mike Nakamaye has been a math educator for 15 years and has been actively involved in all of the endeavors of Illustrative Mathematics, including the production of their entire K-12 curriculum, for nearly ten years.*

*Deborah Peart is the lead writer for 2nd grade for the Illustrative Mathematics Elementary Math Curriculum project. She delivers math professional development and supports teachers and students through SEL workshops. Deborah has twice presented at the NAIS-People of Color Conference with a focus on Approaching Mathematics Mindfully and Equity in Mathematics.*



### Robert F. Brown

Professor, UCLA Mathematics Department

#### CRYPTOLOGY FOR KIDS

MATHEMATICS • GRADES 3-12 • ARTISTRY ROOM

When you buy a book from amazon.com, is it safe to type your credit card number into the online billing form? Yes, even if computer hackers intercept your transmission, they can't read the number because it has been encrypted, that is, put into a coded form by a program called a cipher. The ancestors of the sophisticated ciphers on which today's e-commerce depends were used for centuries to send messages that, it was hoped, could not be read if they fell into the wrong hands. I have taught those “transposition ciphers” and “substitution ciphers” to many 3rd through 5th graders, and to high school students as well. I will teach you some ciphers as you decode my messages that will contain much of the content of my talk.

*Robert F. Brown is Professor of Mathematics at UCLA. He received his Ph.D. from the University of Wisconsin in 1963 and he has taught at UCLA since then. For many years he has volunteered as a mathematics tutor at the Neighborhood Youth Association in Venice.*



## Rachel Behr-Hirst

Secondary Math Specialist, UCLA Curtis Center

### GREAT NEWS: MORE CAASPP DATA IS NOW AVAILABLE!

RESEARCH & RECOMMENDATIONS • GRADES 3-12 • LEGACY ROOM

Have you longed to see your students' performance on the SBAC Summative Assessment listed by Target and not just by Claim? I have great news; such data is available in California! Satisfy your yearning by learning how to access your school's data on CAASPP. In this break-out session, we'll learn how to use the Online Reporting System on CAASPP and discuss instructional implications for educators and departments. Administrators, coaches, and Grade 3-12 teachers are all welcome.

*\*Relevant to California educators only*

*Rachel Behr-Hirst is a Secondary Math Specialist with the UCLA Curtis Center. Before working at the Curtis Center, Rachel worked in the Los Angeles Unified School District as a math teacher and instructional coach. Rachel is passionate about helping departments use data to inform instruction and decision-making. When not thinking about instruction, Rachel likes to Zumba dance and garden.*



## Helen Chan

Director of Professional Development, UCLA Curtis Center

### DEVELOPING PERCENT SENSE WITH MIDDLE SCHOOLERS

PEDAGOGY • GRADES 6-8 • ILLUMINATION ROOM

Percent is a mathematical concept that permeates our lives. Whether related to interest rates, restaurant gratuity, the probability of the UCLA football team winning, or sales discounts, a deep understanding of and facility in working with percents can be valuable knowledge. In this session I will share a series of visually engaging activities that aim to develop and strengthen students' percent number sense. You'll walk away with many ideas that are easy to implement.

*Helen Chan earned a B.S. in Mathematics/Applied Science, a California Teaching Credential, and a Master of Education from UCLA. She has 25 years of experience in K-16 mathematics education. Currently, she writes mathematics curriculum and trains instructors for the Center's professional development work with local mathematics teachers. In addition to her work at The Curtis Center, Helen currently also teaches UCLA undergraduate students preparing to become mathematics teachers. She is a recipient of the 2019 John Hopkins CTY Barder Fellowship.*



## Dr. Kimberly Samaniego

Director of CSU/UC Mathematics Diagnostic Testing Project (MDTP);  
Director of Mathematics Testing and Placement, UC San Diego

### THE MDTP ASSESSMENT SYSTEM: A TOOL FOR TEACHERS

RESEARCH & RECOMMENDATIONS • GRADES 6-12 • IMAGINATION ROOM

We will present an overview of the MDTP Assessment System to include descriptions of MDTP Assessments, highlights of newly released tests and current test development, suggestions for administering and effective uses of MDTP assessments, and how to use MDTP equitably to inform students' next-course options in support of SB-359 – the California Mathematics Placement Act of 2015.

*Kimberly Samaniego is a veteran secondary math educator with 20 years of classroom teaching and leadership who now supports instructors in secondary and higher education. Kim earned her B.A. in Mathematics from CSUS in 1993 and her Ed. D. in Teaching and Learning from UC San Diego in 2013. Her experiences strengthen her ability to fuse her personal goals of providing access to equitable learning opportunities to students from all backgrounds with MDTP's mission of supporting secondary mathematics educators in their work to prepare their students to succeed in college-level mathematics.*



## Daniel Teague

Instructor of Mathematics, NC School of Science and Mathematics

### THE ELEVATOR PROBLEM: WORKING THROUGH THE MODELING CYCLE

PEDAGOGY • GRADES 9-12 • SYNERGY ROOM

The elevator problem is an introductory problem in mathematical modeling. At the North Carolina School of Science and Mathematics we use a version of this task as a first experience in modeling for both beginning algebra students and for students in our advanced mathematics courses. The task uses algebra and basic probability (for the advanced students), but the focus is on thinking about the real world and how the mathematics captures part, but not all, that is important. The importance of the step-wise refinement of the modeling cycle is highlighted.

*Dan Teague has taught mathematics at the North Carolina School of Science and Mathematics since 1982. Nationally, Dan has served as the Second Vice-President of the Mathematical Association of America (MAA) and as Chair of the MAA Special Interest Group on Teaching Advanced High School Mathematics. Dan has also served on the AP Statistics Test Development Committee, was a lead author of the Guidelines on Assessment and Instruction in Mathematical Modeling, and is currently on the Board of Directors of the National Council of Teachers of Mathematics.*



## Kelly Marcum

Teacher, James A. Garfield Sr. High School

### APPLIED MATH STRATEGIES IN SECONDARY MATH CLASSROOMS: MATRICES AND VECTORS

PEDAGOGY • GRADES 11-12 • DISCOVERY ROOM

By examining modern applied math techniques, teachers can better equip their students with an understanding of the relevance of mathematics. Matrices, in particular, are especially critical in modern academia and industry, so students must be informed of these applications. The Computational and Applied Mathematics Research Experience for Undergraduates repeatedly highlighted matrix representations of various data types and a technique called non-negative matrix factorization in 2018. Participants in this session will explore a series of exercises highlighting this technique and data representation using matrices of toys and tweets.

*Kelly Marcum is a secondary math and computer science teacher in the Computer Science Magnet at Garfield High School in East Los Angeles. She received her B.S. in Mathematics for Teaching with Specialization in Computing from UCLA in 2019 and will complete her M. Ed. in June 2020. She has been recognized with the S-STEM Scholar Award from CalTeach for her academic achievements as well as passion and potential as an educator.*

**LUNCH • 11:30-12:30 - BALLROOM PREFUNCTION AREA**



## Dr. Akihiko Takahashi

Associate Professor, DePaul University

### TEACHING THROUGH PROBLEM SOLVING: A JAPANESE APPROACH TO PROMOTE MATHEMATICAL PRACTICE

PEDAGOGY • GRADES K-12 • BALLROOM C

Influenced by US publications of problem solving, including Polya's *How to Solve It* (1945) and NCTM's *An Agenda for Action: Recommendations for School Mathematics of the 1980s* (1980), Japanese researchers and teachers work collaboratively to develop an approach to promote mathematical thinking and problem solving: *mondai-kaiketsu gakusyuu* means "teaching through problem solving" (TTP). This session will use some of the examples from Japanese mathematics textbooks to discuss key features of TTP and how schools can use this approach to promote CCSS-M mathematical practice.

*Akihiko Takahashi, Ph.D. is an Associate Professor at DePaul University, where he teaches mathematics and mathematics education. Prior to coming to the US he was a teacher in Japan before becoming an educator of mathematics teachers. During his teaching career in Japan, he was nationally active in mathematics lesson study, teaching public research lessons and articles on topics including students' mathematical problem-solving and reflective mathematics journals. He received his Ph.D. from the University of Illinois at Urbana-Champaign.*

*He is one of only a few educators in the U.S. with more than twenty years of first-hand experience with Lesson Study in mathematics education. As a result, he has been recognized as one of the world leaders of Lesson Study research and practice since the beginning of the Lesson Study movement in North America.*

*He had the privilege in working with most of the major Lesson Study projects in twelve U.S. states, as well as in Australia, Brazil, Canada, Ireland, Malaysia, Qatar, Singapore, Switzerland, Thailand, and the United Kingdom, helping enthusiastic educators and researchers learn about Lesson Study and develop Lesson Study communities.*



**Kelly Ann Sassone**

Teacher, Da Vinci Schools

**MAKING SENSE OF WORD PROBLEMS**

PEDAGOGY • GRADES K-3 • ENLIGHTENMENT ROOM

To successfully solve a word problem, students must first be able to make sense of the word problem. In order to make sense of the word problem, students must be able to define the relationship or action in the word problem, determine what is unknown, and then make sense of how the relationship or action will help solve for the unknown. Attempting to make sense of word problems can be a challenging task and for many, can create a sense of frustration and defeat. Using familiar contexts, avoiding teaching “key words”, and providing frequent systematic exposure to the various structure types helps every learner make sense of word problems. The sense of accomplishment that accompanies understanding, motivates students to attempt to solve more challenging word problems, further increasing their levels of engagement and achievement in mathematics.

*Kelly Ann Sassone currently teaches kindergarten at Da Vinci Connect. As a literacy specialist, elementary math specialist, lead math teacher, and BTSA mentor; she has supported new and veteran teachers in their professional growth. She has presented at CMC conferences, CCSA conferences, the California Kindergarten Association Conference, and the Southern California Kindergarten Conference. She earned her bachelor's degree and teaching credential from San Diego State University. She earned her administrative credential and Master in Educational Administration from CSUDH.*



**Akihiko Takahashi**

Associate Professor, DePaul University

**COLLABORATIVE LESSON RESEARCH: A FORM OF LESSON STUDY TO MAXIMIZE ITS IMPACT**

RESEARCH & RECOMMENDATIONS • GRADES K-6 • ILLUMINATION ROOM

From research on school-based lesson study in Japan and from the research on and experience with lesson study in schools in the US, we hypothesize that certain institutional structures and practices are important for maximizing its impact, but are sometimes omitted from lesson study outside of Japan. We introduced a new term: collaborative lesson research (CLR), defined to include those structures and practices. The session will provide details of the pilot program and preliminary results from some of the partner schools.

*Akihiko Takahashi, Ph.D. is an Associate Professor at DePaul University, where he teaches mathematics and mathematics education. Prior to coming to the US he was a teacher in Japan before becoming an educator of mathematics teachers. During his teaching career in Japan, he was nationally active in mathematics lesson study, teaching public research lessons and articles on topics including students' mathematical problem-solving and reflective mathematics journals. He received his Ph.D. from the University of Illinois at Urbana-Champaign.*



**Julie McGough**

TOSA Elementary Math Instructional Specialist, Azusa Unified School District

**NOT YOUR GRANDMA'S FLASH CARDS: HELPING STUDENTS' DEVELOPING FLUENCY AND NUMBER SENSE**

PEDAGOGY • GRADES 3-5 • ARTISTRY ROOM

Experience a variety of activities and games you can use to support students in learning their multiplication facts while developing number sense and conceptual understanding of multiplication.

*Julie McGough is a bilingual educator who is passionate about equipping all students and teachers with the tools they need to be successful. She has 26 years of experience and was recognized as a finalist for California State Teacher of the Year. This is her sixth year serving as a Teacher on Special Assignment as an Elementary Mathematics Instructional Specialist serving preschool to 5th grade teachers. She also served as a member of the Smarter Balanced Performance Task writing team.*





## Michelle Welford

Director of Assessment, UCLA Curtis Center

### PERFORMANCE TASKS: WHAT ARE THEY AND CAN YOU HELP ME WRITE ONE?

RESEARCH & RECOMMENDATIONS • GRADES 3-12 • OPTIMIST ROOM

What differentiates a performance task from a classroom activity or other mathematical tasks? How are PTs written? We'll examine resources labeled as performance tasks and evaluate their adherence to the Smarter Balanced Performance Task Specifications. You will actively participate in a portion of the Performance Task Writing Training that the Curtis Center authoring team underwent before starting the current writing cycle for Smarter Balanced. This session will be energetic, informative, engaging, and leave you wanting more.

*Michelle Welford is a Nationally Board Certified Teacher who taught high school mathematics for ten years and served as an instructional coach for the Los Angeles Unified School District for five years. Michelle has also written professional development curriculum in Geometry for the UCLA Mathematics Department. In addition to mathematics, Michelle has extensive knowledge of pedagogy, Common Core State Standards, technology integration, teamwork/collaboration, and time management.*



## Marion Curtis Usselman

Associate Director, CEISMC, Georgia Institute of Technology

### EDUCATIVE MATHEMATICS CURRICULA: CHANGING TEACHER PRACTICE AND BELIEFS USING EXEMPLARS

RESEARCH & RECOMMENDATIONS • GRADES 6-8 • DISCOVERY ROOM

During this presentation, participants take on the role of a civil engineer and use an online simulation to collect data and apply linear functions to determine the most effective insulation material to use in the construction of a clean energy solar power plant. This scenario is one of nine 1-week math PBL modules created by Georgia Tech as part of an NSF Math/Science Partnership project. All modules utilize a variety of manipulatives and simulations and require that students apply math concepts to solve scenario-based challenges. The modules apply Standards of Mathematical Practice within three STEM integration themes: Experimental Design, Data Visualization, and Data Based Decision Making.

*Dr. Marion Usselman is Associate Director for Educational Innovation at Georgia Tech's Center for Education Integrating Science, Mathematics and Computing (CEISMC). She received a B.A. in Physics/Biophysics from UCSD and a Ph.D. in Biophysics from the Johns Hopkins University. She then left bench science to pursue interests in promoting STEM education at all levels. She is Principal Investigator on several Design and Development grants from the NSF, and relishes working with K-12 school partners, designing curriculum, and investigating outcomes.*



## Dr. Kimberly Samaniego

Director of CSU/UC Mathematics Diagnostic Testing Project (MDTP);  
Director of Mathematics Testing and Placement, UC San Diego

### IDENTIFY, ANALYZE, AND ENACT: USING MDTP ASSESSMENTS FORMATIVELY

RESEARCH & RECOMMENDATIONS • GRADES 6-12 • IMAGINATION ROOM

Participants will drill into an MDTP topic to learn how to identify students' strengths, (mis)conceptions, and potential gaps around this topic and unpack the nature of these misconceptions. We will then explore research-based strategies to re-engage students in learning experiences designed to remedy misconceptions and promote retention.

*Kimberly Samaniego is a veteran secondary math educator with 20 years of classroom teaching and leadership who now supports instructors in secondary and higher education. Kim earned her B.A. in Mathematics from CSUS in 1993 and her Ed. D. in Teaching and Learning from UC San Diego in 2013. Her experiences strengthen her ability to fuse her personal goals of providing access to equitable learning opportunities to students from all backgrounds with MDTP's mission of supporting secondary mathematics educators in their work to prepare their students to succeed in college-level mathematics.*



## Naehee Kwun

Teacher, Centinela Valley Union High School District

## William Morejón

Teacher, Centinela Valley Union High School District



## MODELING PROPORTIONAL AND LINEAR RELATIONSHIPS

PEDAGOGY • GRADES 6-8 • ENTREPRENEUR ROOM

In this session, we'll engage in activities that investigate proportional and linear relationships. As we play with manipulatives, we'll explore practices that give access to all students to engage in inquiry and celebrate the wonderfully different perspectives that our students bring. In our work together, we'll also push our current definitions of these relationships and how they have traditionally been introduced to our students.

*Naehee Kwun is in her 13th year as an instructional leader in her district. In addition to teaching, she also serves as a secondary mathematics specialist for Curtis Center and a secondary teacher leader for UCLA Mathematics Project. As a university supervisor at CSU Long Beach, she supports teacher candidates in their first year in the classroom and guides them through reflection and improvement of practice to meet state teaching practice standards. Naehee Kwun earned both a B.S. in Pure Mathematics and a Masters of Education at UCLA.*

*William Morejón earned a B.S. in Biological Engineering from MIT and a Masters of Education at USC. As a mathematics educator, he has developed practices that support differentiated instruction for both intervention and honors populations. He is a big proponent of exploration through the use of concept lessons and technology in the classroom.*



## Claudia Falcon

Assistant Adjunct Professor, UCLA Mathematics Department

## GIRLS TALK MATH: ENGAGING STUDENTS THROUGH MATH AND MEDIA

MATHEMATICS • GRADES 9-12 • SYNERGY ROOM

Come learn about Girls Talk Math, a summer program that starts at UCLA this 2020. The camp's goal is to make advanced mathematics accessible to high school students of underrepresented genders in STEM through a free educational program in which students with an interest in mathematics work with their peers to tackle challenging problems and learn how to effectively communicate their work. In this breakout session, we work through sample problem sets that students would engage in during the program this summer. After seeing the curriculum in action during the camp, it could be extended to other high school mathematics programs and courses.

*Claudia Falcon obtained her Ph.D. in applied mathematics from the University of North Carolina at Chapel Hill. In addition to research and teaching, she is active with undergraduate mentoring and outreach. Her involvement in STEM research is combined with pre-college outreach events that showcase fluids laboratory demonstrations to students. She has recently paired up with the Curtis Center to start Girls Talk Math at UCLA, a mathematics day camp for underrepresented high school students, during the summer 2020.*



## Eden Murphy

Secondary Specialist , UCLA Curtis Center

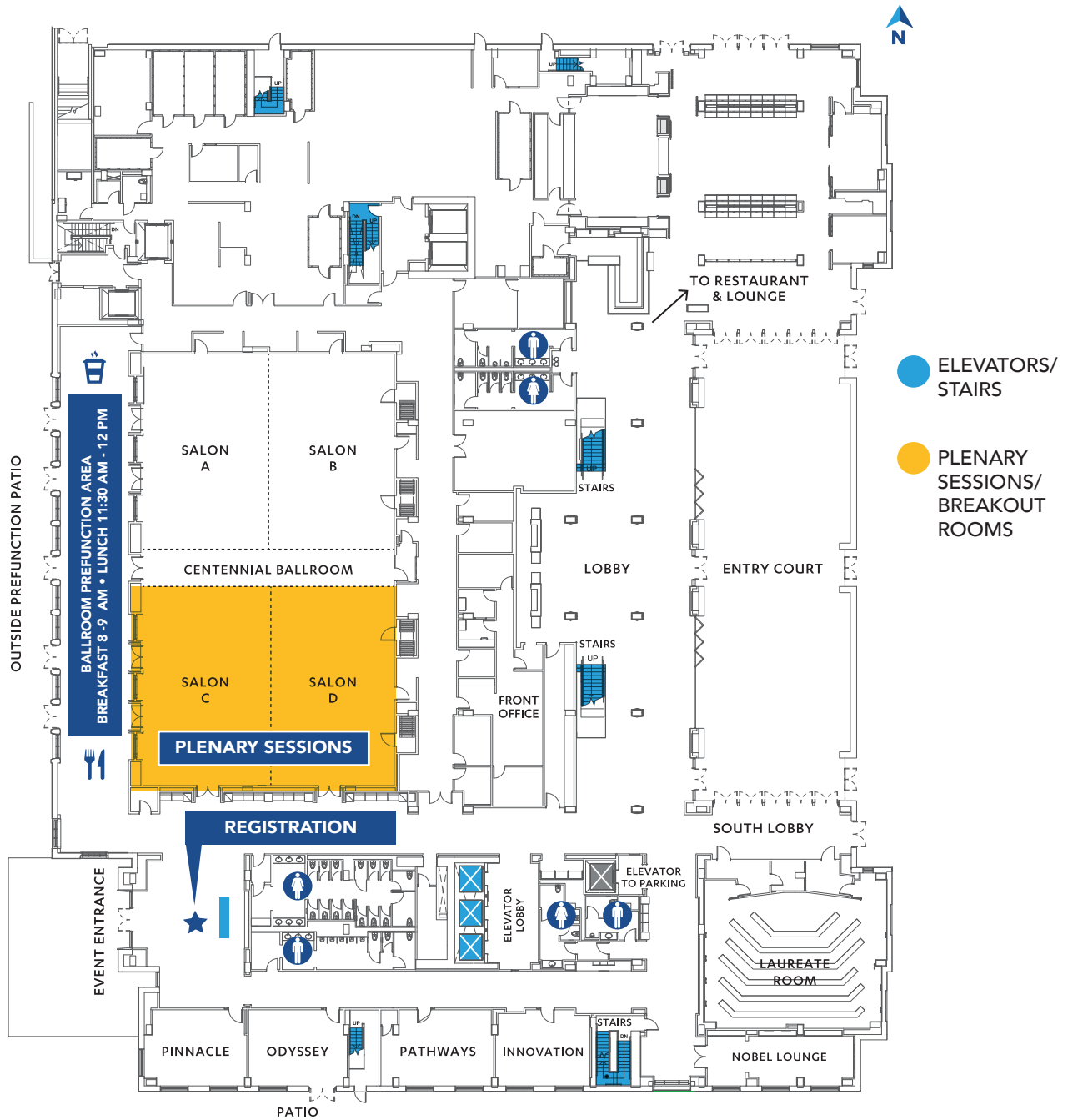
## PIANO AND FREQUENCY: A MODELING LESSON

PEDAGOGY • GRADES 9-12 • LEGACY ROOM

Come learn how technology can enhance data collection and the modeling process! In this session participants will work through a modeling lesson. We will explore the relationship between frequency of a note and its position above middle C by striking tuning forks and collecting data through a sound sensor. We will then look at ways we can begin to have students interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if necessary. Lastly, we will look to see how this lesson connects back to the mathematical content standards and standards for mathematical practice.

*Eden Murphy has been a teacher for the last 9 years. Her favorite way to instruct students is through discovery and inquiry of mathematical concepts. She is currently teaching high school AP Calculus as well as supporting teachers as an instructional coach for the Apple Valley Unified School District. She also works for the UCLA Curtis Center as a secondary specialist providing professional development to K-12 teachers.*

# MEETING SPACE: LEVEL 1



# MEETING SPACE: LEVEL 2

