



2016 Systems Thinking and Dynamic Modeling Conference for K-12 Education

June 25—27, 2016

The Babson Executive Conference Center
Wellesley, MA

FRIDAY, June 24

9:00-5:00

THAMES Pre-Conference Introductory Systems Workshop (registration required) – Anne LaVigne, Creative Learning Exchange and Waters Foundation, and Alan Ticotsky, Innovation Academy Charter School

***SPECIAL:** Throughout the conference, Jeff Potash, an experienced modeler with extensive K-12 experience, will meet with you by appointment to discuss your model or how to incorporate modeling into your curriculum. Schedule a time with him. Sign-up at the registration desk.*

6:00-9:00 pm Conference Registration in Conference Center Lobby

SATURDAY, June 25

8:30-10:00 Registration/Continental Breakfast

10:00-12:00 Welcome, Introductions, and Keynote

MYSTIC A/B

Learning for Ourselves: Interactive Simulations to Address Climate Change

John Sterman

How can we respond to climate change? Does the Paris climate agreement deliver us from climate catastrophe or is it another diplomatic disappointment? Can we build an economy powered by clean, renewable energy in time? What can we do, as teachers, students, and citizens, to build a safer, sustainable world in which all can thrive? We'll explore these questions with interactive simulations of the climate and economy developed at MIT, used by policymakers and negotiators around the world. Most important, the same simulations are used in education, from middle school on up, and in nations literally from A to Z (Argentina to Zimbabwe). We'll talk about how you can get involved and bring these experiences to your students, your colleagues, and your communities.

12:00-1:30 Luncheon

1:30-5:00 Five Parallel Skills-Based Workshops

1. Learning Systems Through Games – Greg Orpen, Innovation Academy Charter School, Tyngsboro, MA

POTOMAC

For students or adults, one of the best ways to learn about systems thinking tools and concepts is by playing games. Participants will engage in a series of kinesthetic activities which model the behaviors of systems. All activities will be debriefed using common tools such as behavior-over-time graphs, feedback loops, and stock/flow diagrams. While this workshop is designed for novices, experienced practitioners are welcome.

2. What Is a Stock and Flow? Stock/Flow Diagrams to Simple Models – Anne LaVigne, CLE

THAMES

You may have heard the phrase, "Be the ball!" from a variety of popular movies. Now you can "Be the system!" Experience simple systems, then create and play with the simple models to go with them. Make connections to a variety of contexts including math, science, and literature.

3. Changing the Game: The Story Continues – Cathy Keegan, Superintendent, and Catherine Girton, Director of Special Education, Milton Area School District; and Tim Lucas, Fifth Discipline Fieldbook Project

MYSTIC A

A review of our past five years of integrating systems tools throughout K-12 programs to impact instructional practice, increase stakeholder involvement, and improve school culture in the Milton Area School District, Milton, PA. We used the supervision and the evaluation process as a systems tool for team learning, building a stronger K-12 shared vision for learning and teaching, and for celebrating our work as educators. Our session will share the models and causal loop interactions that we have put into place.

4. Teacher As System Designer: Classroom Structures for Effective Student Learning –Alan Ticotsky, IACS, Rob Quaden, Carlisle Public School, and LeAnne Grillo, Spaces for Change

MYSTIC B

This workshop examines both the practical and philosophical aspects that contribute to a dynamic, learner-centered classroom. We will look at teaching and learning from several points of view, using a variety of systems tools to consider our mental models and the structures we create. Participants will engage in hands-on activities that can be used to deepen their own thinking and can also be used with students in a variety of classes and grade levels. No previous experience is necessary, and the session is suitable for classroom teachers, administrators, and other educators.

5. Assessments and Standards Are Here to Stay: A Look Through a Systems Lens – Ryan Keser, Brookline Public Schools, Steven Roderick, Lincoln-Sudbury High School, and Jeff Potash, CIESD.

CONNECTICUT

Our goals for this session are to explore the language of standards and the pedagogy of modeling systems, see/hear educators working together across disciplines/across grades, and create a collaborative space, surface existing thinking of others and have a productive conversation.

6:00-7:30 Dinner

8:00 - 9:00 Two Evening Parallel Sessions

1. isee systems New Offerings: A Workshop for Experienced Modelers - Bob Eberlein, isee systems

MYSTIC A

STELLA, which you came to know and love in the classroom, has evolved, and changed the capitalization of its name. Building and using models with Stella has gotten easier, and creating web-based simulations is now a menu click away. Bob Eberlein will discuss the changes and give anyone who brings a computer to the session a chance to follow along and see how the new features work for themselves.

2. Navigating the Resources: Exploring the Online Simulations, Apps, and Lessons for Teaching with Systems

– Conrad Stuntz, CLE

MYSTIC B

This session will provide an overview of the resources available to help work with system dynamics in the classroom. The overview is designed to introduce people to the plethora of options available. It will focus on the content available at the CLE and on other programs and apps that have been released in the past two years.

SUNDAY, June 26

7:00-8:30 Breakfast

8:30-9:30 Keynote

MYSTIC A/B

Mentoring Students: Two Different Models

**David Wheat, Pervin “Pery” Dadashova, Kateryna Ganina, Peter Hovmand,
Lynda Tolley, and Donella Johnson**

The panel will present two different, university-based approaches to mentoring students in systems thinking/dynamic modeling. Professors David Wheat, University of Bergen, and Peter Hovmand, Washington University in St. Louis, will each provide a brief overview of their respective mentoring programs, followed by panelists Pervin “Pery” Dadashova, National University of Kyiv-Mohyla Academy, Ukraine; Kateryna Ganina, Irpin Specialized [Secondary] School No. 2 with Advanced Study of Economics and Law, Ukraine; Lynda Tolley, Washington University in St. Louis; and Donella Johnson, University of Missouri-St. Louis, sharing their reflections on how they became involved in systems thinking/system dynamics, what were some of the most challenging barriers, and the role of institutional supports.

9:45-12:30 Full-Morning Parallel Session or Eight Half-Morning Parallel Sessions

Full Morning Session (9:45-12:30)

1. Using Group Model Building for Community/Teaching Practices– Peter Hovmand & Lynda Tolley, Washington University; and Donella Johnson, University of Missouri

THAMES

Peter Hovmand, Lynda Tolley, and Donella Johnson will provide a brief introduction to “script” based group model building practice and then demonstrate the approach through a series of structured exercises that have been successfully used in the classroom and community settings to facilitate conversations and develop a better understanding on a variety of topics, from racial tension to student engagement. Participants will experience a group model building workshop, get tips on facilitating the exercises, and receive the facilitation manual.

9:45-11:00 Four Half-Morning Sessions

1. How to Get Started Teaching ST/SD Tools in the Science and Social Studies Classrooms– Ryan Keser (STEM/Brookline Public Schools) and Jason O’Neil-Willoughby, IACS

CONNECTICUT

Ready to start using ST/SD tools in your classrooms but not sure where to begin? Wondering how other teachers design curriculum that incorporates the tools without it being “one more thing to teach”? Join these two middle school teachers to learn about their approaches to designing curriculum that incorporates ST/SD models.

2. The Use of Modeling and Other Technologies in Science Education - Diana Fisher, Portland State University

SUSQUEHANNA

Science probes will be used to collect data for several scenarios. The graphs generated from the science probes will be used to validate STELLA models designed to simulate the dynamics for the same scenarios.

3. Deepening Intercultural Competence: Using The Systems Iceberg as a Tool for Debriefing Critical Incidents – Heather Lortie, EdM, LMSW, New York University Abu Dhabi

POTOMAC

Harnessing conflict as a catalyst for change, the systems iceberg proves to be a powerful framework for critical thinking as undergraduates debrief from a critical incident on campus. Experience a slice of New York University’s Intercultural Competence Core Training recently piloted with students hailing from every continent. Take away (and generate) new ideas for using the iceberg to examine complex social challenges and to unpack the invisible aspects of culture that shape the ways we see ourselves and others.

4. The Evolution and Diffusion of Systems Thinking/ Systems Dynamics into the PREP Out-of-School-Time Experience – Raul (Rudy) Reyna, Ph.D.; Joules Webb, Ph.D. Candidate; Jim Dart; and Ben Jurewicz, (PREP), University of Texas at San Antonio

COLORADO

PREP (Prefreshman Engineering Program) is a nationally replicated summer program that prepares middle and high school students for STEM careers. This session, for middle and high school teachers, will provide the history, lessons learned, and next steps in the PREP model evolution.

11:15-12:30 Four Half-Morning Sessions

1. Incorporating Innovative Technology into 21st Century Learning for Pre-K–12 Classrooms – Dr. Irina Tuule, Eduporium, Watertown, MA

COLORADO

In this session, we will discuss the reasons for and steps to take in building and implementing a progressive system of innovative technology in present-day Pre-K–12 learning, as well as examine a working sample of this system. Participants will discover how to recognize and select technology that is appropriate for educational objectives, how dynamic systems of technology and education can work together and benefit from each other, and what methods are ideal for painlessly incorporating technology into teaching. We will introduce the working system of tech integration for all Pre-K–12 teachers.

2. Stories of Becoming: New Research on Building Systems Literacy – Caitlin Steele, University of Vermont

CONNECTICUT

What does it mean to be literate in complex systems? Bill Green’s model of *Literacy in 3D* challenges us to consider subject-specific literacies in terms of three dimensions: cultural, operational, and critical. In this session, we’ll discuss key findings from new research on what it means to be culturally, operationally, and critically literate in systems across a wide range of disciplines, and we’ll explore patterns of experience among people who have developed high levels of such literacy themselves. Together, we’ll consider our own stories of becoming systems literate and how this new research may inform our work in education.

3. Building Systems from Scratch – Gilly Puttick and Eli Tucker-Raymond, TERC

POTOMAC

Participants will engage in a systems game to introduce several systems thinking principles relevant to climate, and view a video depicting how Earth systems interact to affect its energy balance. Participants familiar with Scratch will be supported to design games and/or visualizations focused on systems related to climate change, and those new to Scratch will storyboard a systems game related to climate change concepts. Participants will analyze student games for systems and climate science content, as well as playability. The program will introduce teachers to: a) Scratch, b) systems/computational thinking, and c) climate models and visualizations within the context of student-generated content.

4. Systems Thinking in Education for Sustainability – Alan Cass and Aimee A. Østensen, Children’s Environmental Literacy Foundation (CELFL)

SUSQUEHANNA

The facilitators will model the application of the habits of systems thinking to EfS (Education for Sustainability) related curriculum. During this workshop, you will participate in activities that will deepen your understanding of complex systems and prepare you to teach your students to think in systems. It’s our goal that participants will leave with enduring strategies to apply with their ongoing and future practice.

12:30-1:30 Luncheon

1:30- 5:00 Two Three-Hour Workshops

1. World Climate: an Interactive Role Play Simulation of the Global Climate Negotiations – John Sterman

MYSTIC A

Come and play the role of climate negotiators in Paris. Can you work with other nations to agree on a plan to limit climate change and global warming? We’ll use an interactive system dynamics simulation of the climate to see. “World climate” is an engaging educational role play now used around the world. It’s been played by students from middle school up, by senior business leaders, by senior policymakers and government officials around the world. All resources you need to learn and run it yourselves are freely available.

2. Rethink Health – Rebecca Niles

MYSTIC B

Join a health-care system simulation and see if you can improve health outcomes and reduce costs! The Rethink Health system dynamics simulation is designed to support multi-stakeholder communication, planning, and design, to help groups establish a healthier, more equitable and sustainable health system. Bring a big laptop for sharing.

5:30-6:30

WOODSIDE

Student Projects from DynamiQueST, the Ukraine, and elsewhere

6:30-8:00 Dinner

8:00-9:00

Making System Dynamics Fun - Ninad Jagdish, Director of BTN, Singapore

MYSTIC A

System dynamics is a powerful lens that brings clarity to a complex world, yet many SD models are intimidating and hard to use. Does it have to be this way? Should system dynamics be made more easy, intuitive and fun, and, if so, how? We’ll look at innovations in the fields of story-telling, gamification and next-gen computer interfaces, discuss how SD might benefit from them, and imagine the models of the future. Bring your own questions and help shape the event.

MONDAY, June 27

7:00-8:30 Breakfast

9:00-12:00 Keynote

MYSTIC A/B

Systems Tools in Action: Unpacking a Complex Classroom Challenge

Brad Morrison and Tracy Benson

When very capable students have low expectations for themselves and subsequently underperform, what can educators and parents do to address this challenge? We will use this common case to guide participants through an engaging systems thinking process. Working in small teams, participants will apply systems tools to problem definition, the identification of patterns and trends and causal interdependencies, the surfacing of ways to intervene leading to action steps. We hope to support novices and challenge the experienced using a highly participatory, practical learning environment.

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