

Conference Agenda

Session Overview

Date: Monday, 05/July/2021

1:30pm - 2:00pm	Opening Ceremony Location: Room 1					
2:00pm - 3:00pm	Keynote 1: Exploring STEM: From Roots to Flowers Location: Room 1 Chair: Prof. David Anderson , University of British Columbia Author: Prof. Douglas McDougall , University of Toronto					
3:00pm - 3:15pm	Break					
3:15pm - 4:45pm	Paper Session 1.1: STEM and Soft Skills Location: Room 1 Examining the Manifestation of Scientific Empathy Among Korean Elementary School Students Heesun Yang ^{1,2} , David Anderson ¹ , Seong-joo Kang ² ¹ The University of British Columbia, Canada; ² Korea National University of Education, South Korea Differentiated Instruction in Science Classrooms: Methods, Outcomes, and the Potential Role of Technology Mohammed Estaiteyeh University of Western Ontario, Canada Animating The Inquiry Process On Climate Change Through Learning Of Mathematical And Communicative Literacies Sean Chorney, Angel Lin Simon Fraser University, Canada	Paper Session 1.2: Social Issues Location: Room 2 Wasisək kisihtohit [Children Made It]: Coding Workshops as a Site For Professional Development For Teacher Candidates and Practicing Teachers Shaunda Wood ¹ , Joleen Paul ² ¹ St. Thomas University, Canada; ² St. Thomas University, Canada "Start With Where You Are": The View Of Indigenizing STEM Curriculum From Educational Outreach Richard Canevez ¹ , James Shaw ² , Soundous Ettayebi ² , Charlene Everson ³ ¹ Pennsylvania State University; ² Geering Up Engineering Outreach; ³ K'omoks First Nation Recognition of STEM Human Resources Community by Higher Education Students in JAPAN and MALAWI Tomotaka Kuroda Graduate School of Science and Technology, Shizuoka University, Japan	Paper Session 1.3: STEAM/Interdisciplinary Location: Room 3 A STEAM-Oriented Activity in a Taiwanese Elementary School: What Children Learn in a Grade 3 Language Classroom Chi-Jen Lin ¹ , Wen-Hui Tseng ² ¹ National Taiwan University of Science and Technology, Taiwan; ² Taipei Municipal Jian-Kang Elementary School, Taiwan Examination of Effects of Transdisciplinary Steam Education on Students' Career Choices Sumeyra Hallac Karakapici, Feral Ogan Bekiroglu Marmara University, Turkey STEAM Education in Canada: Student Learning and Transferable Skills Marja Gabrielle Bertrand, Immaculate Kizito Namukasa Western University, Canada STEM Integration in Middle School Life Science Gillian Roehrig, Jessica Dewey University of Minnesota, United States of America	Workshop 1.1 Location: Room 4 Artificial Intelligence and Digital Citizenship Matthew Griffin Kids Code Jeunesse, Canada Making the Story of STEM Learning Visible – Mathematica, Raspberry Pi and Arduino as Narrative Tools for Systems Engineering Colin Bronislaw Chapman Victorian Curriculum and Assessment Authority - AUSTRALIA	Workshop 1.2 Location: Room 5 Beyond Observing: The Multiple Uses of a New Integrated STEM Education Observation Protocol Emily Anna Dare ¹ , Joshua A. Ellis ¹ , Elizabeth A. Ring-Whalen ² , Gillian H. Roehrig ³ ¹ Florida International University, United States of America; ² St. Catherine University; ³ University of Minnesota Using Google Apps to Create an Inclusive Science Classroom Christina Louise Drescher UBC Masters of Education in Science Education, Vancouver, Canada	Panel 1.1 Location: Room 6 STEM Teacher Education and Professional Development: Examining Possibilities for Collaboration Dragana Martinovic ¹ , Yifat Ben David Kolikant ² , Marina Milner-Bolotin ³ , David Anderson ³ , Laura Gorjao Stringer ⁴ , Mike Hengeveld ⁵ ¹ University of Windsor, Canada; ² Hebrew University of Jerusalem; ³ University of British Columbia; ⁴ Gleneagle Secondary School; ⁵ Templeton Secondary School Building Relational Connections in STEM Education Through Indigenous Epistemology and Immersive Experiences Poh Tan ¹ , Paula MacDowell ² ¹ Simon Fraser University, Canada; ² University of Saskatchewan, Canada
4:45pm - 5:00pm	Break					
5:00pm - 6:30pm	Panel 1.2 Location: Room 1 How Can Outreach Foster Further Interest in STEM and Eventually Lead to Careers in	Symposium 1 Location: Room 2 Changing The Landscape: STEM Educational Reform Through Cross-Disciplinary Approaches	Workshop 1.3 Location: Room 3 Gone Girl: An Arts-based Approach to Address the Roots of Gender Disparity in STEM Disciplines and Fields	Innovative Showcase 1.1 Location: Room 5 The STEM High School Program: Practical Application of a	Sponsored: Callysto Workshop Location: Room 6 Teaching Digital Workforce Skills in the Classroom Michael Lamoureux	

<p>STEM? Natalia Bussard¹, Christin Wiedemann², Olivia New³, Joel Liman⁴, Theresa Liao⁵, Jo- Ann Coggan⁵ ¹UBC, Stewart Blusson Quantum Matter Institute; ²Slalom Build; ³STEM ACES; ⁴UBC, Faculty of Science and Faculty, Land and Food Systems; ⁵Science World, BC</p> <p>They Learn, We Learn, Building a Multidisciplinary STEM Learning Community To Prepare Pre- Service Teachers For Science Teaching Diana Bedoya¹, Eileen van der Flier- Keller¹, Michelle Ciolfitto^{1,2}, Allan Mackinnon¹, Daria Ahrensmeier¹, Dominic Mallet¹ ¹Simon Fraser University, Canada; ²School District 43</p>	<p>Lesley Wong¹, Yu- Ling Lee², Kshamta Hunter¹ ¹University of British Columbia, Canada; ²Trinity Western University</p>	<p>Melanie Vanessa Williams, Anne Marie Miki Dufferin-Peel Catholic District School Board, Canada</p> <p>New Stories For Old: Perimeter Institute Resources And Opportunities For Modern Physics In Junior And Senior High School Science Lu Li¹, Philip Freeman^{2,3}, Jason Chow² ¹North Vancouver School District (44), Canada; ²Richmond School District (38), Canada; ³The Perimeter Institute for Theoretical Physics, Canada</p>	<p>PBL Framework in a Traditional Secondary School Context Michael Hengeveld, Carl Janze Vancouver School Board, Canada</p> <p>Bridging Biology and Computer Science to Engage High School Students in Solving Real World Problems Elizabeth F. Ryder¹, Carolina Ruiz¹, Shari Weaver¹, Robert J. Gegear² ¹Worcester Polytechnic Institute, Worcester, MA, United States of America; ²University of Massachusetts Dartmouth, N. Dartmouth, MA, United States of America</p>	<p>PIMS Callysto</p> <p>Coding, computational thinking, and data science are important skills for the growing digital workforce. In this workshop, teachers will learn how to add these skills into their classrooms by using Callysto – a federally-funded, online, curriculum- tied tool designed for Grades 5-12 students. Educators who use Callysto in their classrooms will lead the session. Participants are asked to bring their own laptops where possible, so they can jump into Callysto tutorials. For more information on the Callysto project, please visit Callysto.ca</p>
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Date: Tuesday, 06/July/2021

2:00pm - 3:00pm	Keynote 2: Teaching Calculus to Life Science Students Location: Room 1 Chair: Dr. Marina Milner-Bolotin , University of British Columbia Author: Prof. Leah Edelstein-Keshet , University of British Columbia				
3:00pm - 3:15pm	Break				
3:15pm - 4:45pm	Paper Session 2.1: Innovative Pedagogy or Curricula Location: Room 1 Making Space For Inquiry In A High School STEM Laboratory James Gauthier, Douglas Adler, Samson Nashon, Marina Milner-Bolotin University of British Columbia, Canada Inclusion in a STEM Innovation Hub: Perspectives of Teachers and Administrators Katie Laux, Larry Plank Hillsborough County Public Schools, United States of America What is STEM? A Comparative Case Study of Elementary Students' STEM Conceptions Based on Whether Their School has a STEM Focus Elizabeth A. Ring-Whalen, Jeanna R. Wieselmann, Gillian H. Roehrig St. Catherine University, United States of America	Paper Session 2.2: Research Approaches Location: Room 2 Impact of Mathematics Centre Intervention at a South African University of Technology Radley Mahlobo, Ramoshweu Lebelo Vaal University of Technology, South Africa Becoming a More Epistemologically Fluent STEM Teacher: The Makerspace as Pedagogical Frame Sandra Lynn Becker, Michele Jacobsen University of Calgary, Canada Critical Thinking Skills In Evaluating Statistically Based Reports Shunya Koga University of Tsukuba, Graduate School of Comprehensive Human Sciences, Japan & Research Fellow of Japan Society for the Promotion of Science	Paper Session 2.3: Informal Contexts Location: Room 3 Science Fiction Conventions as an Informal Learning Space: Exploring Attendees Attitudes About Science Kania Greer ¹ , Donna Governor ² , Gina Childers ³ , ¹ Georgia Southern University, United States of America; ² University of North Georgia, United States of America; ³ Texas Tech University, United States of America Stem-Based Initiatives In An Informal Learning Context: Starting The Journey Virgilio Jr Guinto Medina Qatar National Library, Qatar A STEM Club For Low-Income Youth Explores Strategies For Strengthening Community Responsiveness In Informal Science Education Lydia E Carol-Ann Burke ¹ , Kristen Schaffer ² , Dina Alkhooly ³ ¹ University of Toronto, Canada; ² University of Toronto, Canada; ³ Visions of Science	Paper Session 2.4: Online STEM Education Location: Room 4 A New 21st Century Quantitative Learning Theory For Improving Stem Education In Both Face-To-Face And Online Stanislaw Maj SPM consulting, Australia Curiosity-driven, Inquiry-based Science Projects Bridge Face-to-face and Online Learning Formats during Covid-19 Carol Rees ¹ , Michelle Harrison ¹ , Grady Sjobkqvist ² , Morgan Whitehouse ² , Elizabeth deVries ² , Christine Miller ¹ ¹ Thompson Rivers University, Canada; ² School District 73	Panel 2.1 Location: Room 5 STEAM Education Across Contexts: How Informal Learning Organizations Support Lifelong Learning Karen Lee ¹ , Trish Pattison ² , Yukiko Stranger-Galey ³ ¹ Science World BC, Canada; ² HR MacMillan Space Centre; ³ Beaty Biodiversity Museum Scientific Leadership - A STEM Youth Movement Igor Ronin, Maya Lugassi, Tizah Margolin RASHI Foundation, Israel Scientific Leadership - A STEM Youth Movement
4:45pm - 5:00pm	Break				
5:00pm - 6:30pm	Paper Session 2.5: Technology Location: Room 1 Philosophy of Technology for Children and Youth II Paula MacDowell ¹ , Stephen Petrina ² ¹ University of Saskatchewan, Canada; ² University of British Columbia, Canada Learners as Players and Designers: a Formal Learning Approach to Game Design Farzan Baradaran Rahimi, Beaumie Kim University of Calgary, Canada	Paper Session 2.6: Teacher Education Location: Room 2 SCI 192 The Science Around Us – An Innovative, Student-Centred, Multidisciplinary Approach To Meeting The Science Lab Requirement For Pre-Service Teachers Eileen van der Flier-Keller ¹ , Diana Bedoya ¹ , Michelle Cioffitto ^{2,1} , Sarah Johnson ¹ , Daria Ahrensmeier ¹ , Peter Hollman ¹ , Rebecca Goyan ¹ , Sophie Lavieri ¹ , Glyn Williams-Jones ¹ , Dominic Mallett ¹ , Allan MacKinnon ¹ ¹ Simon Fraser University, Canada; ² School District 43 Coquitlam Research on STEM teachers Professional	Paper Session 2.7: STEM and Soft Skills Location: Room 3 Research on Career-oriented STEM Curriculum Design Strategy Jingyu He, Yu Wang, Yan Dong Beijing Normal University, China, People's Republic of Measuring Changes In Scientific Skills And Attitudes For Non-Science Majors In A Three Week Laboratory Course Ian Blokland, Sheryl Gares, Brian Rempel University of Alberta Augustana Campus, Canada Understanding STEM Identity Using the High School Longitudinal Study from the U.S. National Center for	Panel 2.2 Location: Room 4 Designing the “STEAM +” Learning Projects to Bridge Compulsory Education Schools and Museums in China Le Wang Shaaxi Normal University Virtual, Science, and Art: The Art of Education Jiyoung Shim ¹ , Hojung Choi ¹ , Kari Li ² , ¹ Hsiao-Cheng Han ¹ The University of British Columbia, Canada, ² Teachers College, Columbia University	Workshop 2.3 Location: Room 5 Computational Thinking Activities for Pre-Literate Children Bowen Hui University of British Columbia Okanagan, Canada Collaboration: A Change Catalyst For Future Generations Of STEM Professionals Katherine Weber ¹ , Karen Peterson ² ¹ Canadian Collaborative for Equity in S.T.E.M.; ² National Girls Collaborative Project

**Development and
Teachers Education: A
Case Study in China**

Lu Hang
Beijing Normal University,
Beijing, China

**Investigating Views Of
Pre-service Science
Teachers On STEM
Education**

Ziyi Huang¹, Shangyi Ye²,
Chunyan Zhang², Tao Hu²

¹Shenzhen Experimental
School, Shenzhen, China;

²East China Normal
University, China

**Owning Stem: Pre-
Service Teacher's
Professional
Development Through a
Collaborative Research
Project**

Jenny S-W Yuen, Miwa A
Takeuchi
University of Calgary,
Canada

Education Statistics

Dick Michael Carpenter
University of Colorado,
United States of America

Date: Wednesday, 07/July/2021

2:00pm - 3:00pm	Keynote 3: STEM + Art = Design Education: How Can Youth Education Promote STEM Learning? Location: Room 1 Chair: Prof. Samson Nashon , University of British Columbia Author: Prof. Daniel Roeher , University of British Columbia					
3:00pm - 3:15pm	Break					
3:15pm - 4:45pm	Paper Session 3.1: Technology Location: Room 2 SOUL (Slow Online Ubiquitous Learning) Stephen Petrina, Matul Alam, Franc Feng University of British Columbia, Canada Research on the Influence of Learning Based on Game Design on the Deep Learning of Middle School Students Li Xinyi, Yan Xiaomei, Xiao Yue, Wang Jingying Beijing Normal University, China, People's Republic of	Paper Session 3.2: Research Approaches Location: Room 3 Learning Analytics As A Tool Of Progressivism Fabian Froehlich UBC, Canada Using Structured Inquiry-Based Teaching Strategies In A Statistics Course Murray Black Auckland University of Technology, New Zealand	Paper Session 3.3: STEAM/Interdisciplinary Location: Room 4 Re-Storying the M in STEM: How Mathematics Education Might/Can Shape STEM and STEM Education Jennifer Thom ¹ , Cynthia Nicol ² , Amanda Fritzelan ¹ , Krista Francis Francis ³ , Florence Glanfield ⁴ , Elmer Ghostkeeper ⁴ ¹ University of Victoria; ² University of British Columbia, Canada; ³ University of Calgary; ⁴ University of Alberta Does School Mathematics Support STEM Education? – Exploring Specialized Mathematical Knowledge For STEM Education Armando Paulino Preciado Babb, Sharon Friesen University of Calgary, Canada Realizing STEM Heuristics in a Mathematics Problem Solving Activity Allen Leung Hong Kong Baptist University, Hong Kong S.A.R. (China)	Panel 3.1 Location: Room 5 Could Primary Teachers' Science Capital Have An Impact On That Of Their Students ? Rich Barnard Brunel University London, United Kingdom Digital Storytelling: STEAM in Education Kyle Stooshnov ¹ , Yi Meng ² , Weronika Stepien ¹ , Diana Ihnatovych ¹ , Hsiao-Cheng Han ¹ ¹ The University of British Columbia, Canada; ² Simon Fraser University	Workshop 3.1 Location: Room 6 Increasing STEM Students' Intellective Capacity With Process Oriented Guided Inquiry Learning (POGIL) Mare Sullivan ¹ , Elizabeth Straszynski ² ¹ Seattle Pacific University, Seattle WA United States of America; ² University of Toronto Schools, Toronto ON Canada STEM Robotics Activities in an Undergraduate Elementary Education Program: A Workshop for Pre-Service, Inservice Teachers, and Teacher Educators Matt Flores, Amanda Thomas University of Nebraska–Lincoln, United States of America	Sponsored: Nelson-Edwin Workshop Location: Room 7 How Edwin supports innovative pedagogies and STEM Kathleen Barter, Ken Peterson, Claire Varley Nelson Education The foundation to STEM education is built on the core skills of critical thinking, creativity, collaboration, and real world application. This session will explore how the resources in Edwin support these crucial skills, the interdisciplinary planning of STEM units, and the creation of STEM performance tasks. Attendees of this session will have an opportunity to receive Free Edwin Access until the end of July 31 2021 and will receive access to an Edwin STEM lesson. If you have questions ahead of this session, please email robyn.reekie@nelson.com.
4:45pm - 5:00pm	Break					
5:00pm - 6:30pm	Paper Session 3.4: Technology Location: Room 2 Teacher's perceptions about technology integration in Ugandan Schools Stella Maris Namee University of British Columbia, Canada The Use of Situated Learning in C++ Programming Language Acquisition Ruth Xiaoqing Guo, Stephen Edgar Gareau SUNY Buffalo State, United States of America How Does The Degree Of Guidance Support Students' Computational Thinking In Educational Robotics?	Paper Session 3.5: Innovative Pedagogy or Curricula Location: Room 3 Exploratory Study of the Hypothetical Learning Trajectory of Chinese Students' Speed Concept Rui Ding ¹ , Xuanzhu Jin ² , Yingxia Zhang ¹ ¹ Northeast Normal University; ² The Education University of Hong Kong Resiliocentric Engineering for E-STEM Education and How to Lead Students to Engage in the Activities Tomoki Saito ¹ , David Kimori ² , Thomas Meagher ³ ,	Paper Session 3.6: STEAM Education in times of Covid-19 Pandemic Location: Room 4 Students' Computational Thinking in Two Mathematics Block-based Programming Environments: Research During Covid-19 Jesus Enrique Hernandez-Zavaleta ¹ , Sandra Becker ¹ , Douglas Clark ¹ , Corey Brady ² , Natalie Major ³ ¹ Werklund School of Education - University of Calgary; ² Peabody College - Vanderbilt University; ³ Canadian Rockies Public Schools Research On The Implementation Status Of Primary STEAM Education In Northeast China During COVID-19 -- Based On Field Interviews Of Four Schools In Changchun Dong Han, Yuetong Dong, Ruohan Hua, Jiayi Du Northeast Normal University, China, People's Republic of Covid-19 Effect On	Panel 3.2 Location: Room 5 Innovative Learning Environments (ILEs) in the Periphery – Moving from Theory to Practice in distance learning Maya Lugassi ¹ , Shani Sa'adon Chetrit ¹ , Orly Rauch ² , Guy Beigel ² , Oren Baratz ³ , Tirzah Margolin ⁴ ¹ Beit Yatziv; ² Social Finance Israel; ³ Jewish Federation of Cleveland; ⁴ RASHI Foundation Bridging the Gap in STEM with Education, Industry and Governmental Partners During a Global Pandemic Lindsey Keith-	Symposium 2 Location: Room 6 Designerly Ways, Means, and Ends: From STEM to STEAM to STEAMD Stephen Petrina ¹ , Rachel Ralph ² , Jillianne Code ¹ , Jennifer Zhao ¹ , Kieran Forde ¹ ¹ University of British Columbia, Canada; ² Centre for Digital Media	

Siyu Zha¹, Guang Chen²

¹Lab for Lifelong Learning, Tsinghua University, China;

²School of Educational Technology, Faculty of Education, Beijing Normal University

Masahisa Sato⁴, Teresa Shume⁵

¹Juntendo University, Japan;

²Minnesota State University, Mankato;

³University of Minnesota; ⁴Tokyo City University;

⁵North Dakota State University

Using Integrated Approach to Teach Science: A Fijian Case Study
Parmeshwar Mohan, Deepa Chand
University of Tasmania, Australia

Students' Motivation And Interest On Stem Education
Hebah Fahad Alamr
University of Calgary, Saudi Arabia

Vincent¹, Don Schillinger², Tireka Cobb³, Nathan Lippe⁴, Susanne Thompson⁵, David LaFargue⁶

¹Louisiana Tech University, United States of America;

²Louisiana Tech University, United States of America;

³Louisiana Board of Regents LOSFA Division - LA GEAR UP;

⁴Coursera.org;

⁵Discovery Education;

⁶Louisiana Board of Regents, LASTEM

Date: Thursday, 08/July/2021

2:00pm -	Keynote 4: STEM as an Expression of Indigenous Science Location: Room 1 Chair: Dr. Sandra Anne Scott , UBC Author: Prof. Deborah McGregor , York University					
3:00pm -	Break					
3:15pm -	Break					
3:15pm -	Break					
4:45pm	Paper Session 4.1: Social Issues Location: Room 1 STEM Education through Socio-scientific Issues: Opportunities and Barriers to Achieving Social Justice Jessica S.C. Leung ¹ , Maurice M.W. Cheng ² ¹ The University of Hong Kong; ² The University of Waikato, New Zealand STEM Enrollment of Second-Generation Immigrant Students with High-Skilled Parents Svetlana Chachashvili-Bolotin ¹ , Sabina Lissitsa ² , Marina Milner-Bolotin ³ ¹ Ruppin Academic Center, Israel; ² Ariel University, Israel; ³ University of British Columbia, Canada Motivational and Challenging Factors that Contribute to Gender Imbalance in Post-Secondary Computer Science Education Mirela Gutica British Columbia Institute of Technology, Canada	Paper Session 4.2: Assorted Themes Location: Room 2 Reverse the Wind: How STEM Higher Education Practices in Eastern China Compare with Higher Education Practices in the U.S. Stephen Edgar Gareau, Ruth Xiaoping Guo SUNY Buffalo State, Buffalo, New York Enhancing Maths Teachers' Pedagogy in Special Schools in Queensland Australia Bronwyn Ewing Queensland University of Technology, Australia Effect of Computer Simulation on Students' Motivation and Engagement in Physics Learning: Experience from Tanzanian Secondary Schools. Angela Mercy Rutakomozibwa University of British Columbia, Canada	Paper Session 4.3: STEAM/Interdisciplinary Integrated STEM Location: Room 3 Factors which Sustain Integrated STEM Curriculum Approaches in Secondary School Settings Judy Anderson, Debbie Tully The University of Sydney Student Club Integrated Internal Expeditionary Outreach David Robert Bruce Fulbright University Vietnam, Vietnam Development and Implementation of Citizen Science Based STEAM Programs for Elementary Students in Korea Soo-Young Lee ¹ , Youngseok Jhun ¹ , Kapsu Kim ¹ , Hae Ae Seo ² ¹ Seoul National University of Education, Republic of Korea; ² Pusan National University, Republic of Korea	Paper Session 4.4: Teacher Education Location: Room 4 Coteachers' Interactions for Professional Learning in a First Grade Classroom Moving to Student-Centered Scientific Inquiry Carol Rees Thompson Rivers University, Canada Connecting Teachers' Beliefs about Physics and Concerns Regarding a New Curriculum Document Ellen Rose Watson University of Alberta, Canada Supports and Barriers for Teacher Professional Learning and Growth Richelle Marynowski University of Lethbridge, Canada Pre-Service Teacher Education: Recognising And Enhancing Student Digital Technology Skills For Best Practice In The STEM Classroom Michelle Mukherjee, Shaun Nykvist, Christopher Blundell Queensland University of Technology, Australia	Workshop 4.1 Location: Room 5 What Is High-Quality STEM? The Development and Application of an Integrated STEM Rubric Mia Dubosarsky, Donna Taylor Worcester Polytechnic Institute (WPI), United States of America Computational Thinking Across the Curriculum Wendy Lorch Science World BC, Canada	Innovative Showcase and Panel Location: Room 6 Augmented Reality for Stem Learning: Engaging Minds with Technologies that Invite and Immerse Paula MacDowell ¹ , Quincy Wang ² ¹ University of Saskatchewan, Canada; ² Simon Fraser University, Canada Revisioning Education Through Technology Kwesi Yaro ¹ , Junsong Zhang ² , Jennifer Zhao ¹ , Hsiao-Cheng Han ¹ ¹ The University of British Columbia, Canada; ² Justice Institute of British Columbia
4:45pm -	Break					
5:00pm -	Break					
5:00pm -	Break					
6:30pm	Poster Session (In breakout rooms) Location: Room 1					
	Poster Session					

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