



# ICHS<sup>®</sup>

International Conference  
on Hydrogen Safety

“Hydrogen for the global market”

**SEPTEMBER 24 – 26, 2019**

Adelaide, Australia

## PROGRAM

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Time	Monday, September 23, 2019	
16:00	Registration Open	
16:15	East Foyer	<b>Welcome Reception</b> Adelaide Convention Centre
17:00	<b>Welcome Remarks</b> Nick Smith and Stuart Hawsworth (including native Australian animals)	

Time	Tuesday, September 24, 2019		
7:40	Registration		
	Skyway A - Level 1	Political Plenary Chair Stuart Hawsworth	
8:30	Welcome to the country Jack Buckskin		
8:40	Welcome Remarks Stuart Hawsworth, President IA HySafe and Nick Smith, South Australian Government, Department for Energy and Mining		
9:00	Opening Remarks Hon Steven Marshall, Premier of South Australia		
9:10	Australia Dr. Alan Finkel, Chief Scientist of Australia		
9:30	Europe Bart Biebuyck, FCH JU		
9:50	US Laura Hill, US Department of Energy		
10:10	Japan Shigeru (Sam) Muraki, Green Ammonia Consortia		
10:30	Germany Thorsten Herbert, NOW		
10:50	Hydrogen Council Dr. Soonil Jeon, Hyundai Motor Corporation		
11:10	Coffee Break Sponsor presentation; Heatlie		
	East E1  H2 Effects on Materials 1 Chair I. Azkarate	Skyway A - Level 1  Safety of Infrastructure 1: Chair M. Mazzaro	East E3  Release and Mixing of Cryogenic Hydrogen Chair T. Jordan
11:40	ID104, Safety criteria for the transport of hydrogen in permanently mounted composite pressure vessels Georg Mair, Bin Wang, Herbert Saul	ID154, Near-term location of hydrogen refueling stations in Yokohama city from the perspective of safety Masaaki Fuse, Nobuaki Kawanishi, Hiroki Noguchi, et.al.	ID174, Choked two-phase flow with account of discharge line effects Alexandros Venetsanos
12:00	ID217, Hydrogen storage - Recent improvements and industrial perspectives Herve Barthelemy, Marie Vidovic, Mathilde Weber, et.al.	ID203, Thermal radiation properties of large hydrogen leaks from gas distribution networks Daniel Allason, Lorraine Jenney, Ann Halford, et.al.	ID132, Dispersion of cryogenic hydrogen through high-aspect ratio nozzles Bikram Roy Chowdhury, Ethan Hecht
12:20	ID103, Determination of distribution function used in Monte Carlo simulation on safety analysis of hydrogen vessels Bin Wang, Georg Mair, Stephan Gesell	ID227, Hydrogen-fueled car fire spread to adjacent vehicles in car parks Frank Markert, Luisa Giuliani	ID121, Numerical prediction of cryogenic hydrogen vertical jets Stella G. Giannissi, Alexandros G. Venetsanos, Ethan S. Hecht
12:40	ID206, Nanotechnology enabled hydrogen gas sensing Paul Atkin, Hanie Hashtroudi, Lan Mackinnon, et.al.	ID212, 3D quantitative risk assessment on a hydrogen refuelling station in Shangai Yang Liang, Xiangmin Pan, Cunman Zhang, et.al.	ID191, Cryogenic hydrogen jets: flammable envelope size and hazard distances for jet fire Donatella Cirrone, Dmitriy Makarov, Vladimir Molkov
13:00	East Foyer	Lunch	

	<b>East E1</b> <b>H2 Effects on Materials 2</b> Chair I.Azkarate	<b>Skyway A - Level 1</b> <b>Safety of Infrastructure 2</b> Chair D. Houssin	<b>East E3</b> <b>Physical Effects 1</b> Chair D. Melideo
14:00	<b>ID144, Effect of microstructural and environmental variables on ductility of austenitic stainless steels</b> Chris San Marchi, Joseph A. Ronevich, Julian Sabisch, et.al.	<b>ID218, Impact of mechanical ventilation on build-up and concentration distribution inside a 1-m<sup>3</sup> enclosure considering hydrogen energy applications conditions of use. Experiments and modelling.</b> Deborah Houssin-Agbomson, Elena Vyazmina	<b>ID112, Experimental study on accumulation of helium released into a semi-confined enclosure without ventilation</b> Zhe (Rita) Liang, Aidan McKenna, Tony Clouhier, et.al.
14:20	<b>ID201, The dependence of fatigue crack growth on hydrogen in warm-rolled 316 austenitic stainless steel</b> Zhitao Wu, Chengshuang Zhou, Yuanjian Hong, et.al.	<b>ID236, Risk assessment and ventilation modeling for hydrogen vehicle repair garages</b> Brian Ehrhart, Shaun Harris, Myra Blaylock, et.al.	<b>ID105, Validation of Two-Layer model for underexpanded hydrogen jets</b> Xuefang Li, Bikram Roy Chowdhury, Qian He, et.al.
14:40	<b>ID192, Low permeable, thermally stable polymeric material for use in hydrogen service</b> Charles James, Scott McWhorter	<b>ID270, Hydrogen explosion hazards limitation in battery rooms with different ventilation systems</b> Dorota Brzezinska	<b>ID160, Ignition of H<sub>2</sub>-N<sub>2</sub>O/N<sub>2</sub>O<sub>4</sub> mixtures under volumetric expansion conditions</b> Remy Mevel, Yizhuo He, Yu-Cheng Liu
15:00	<b>ID280, H-Mat hydrogen compatibility of polymers and elastomers</b> Kevin Simmons, Wenbin Kuang, Nalini Menon, et.al.	<b>ID117, Development of risk mitigation guidance for sensor placement inside mechanically ventilated enclosures - Phase 1</b> Andrei V. Tchouvelev, William Buttner, Daniele Melideo, et.al.	<b>ID216, Experimental study of light gas dispersion in a channel</b> Dag Bjerketvedt, Knut Vaagsaether, Osama M.Ibrahim
15:20	<b>ID129, Materials aspects associated with the addition of up to 20 mol% hydrogen into an existing natural gas distribution network</b> Keith Birkitt, Marianne Loomorrey, Adam Bannister, Stuart Hawksworth, Kate Jeffrey, Keith Owen Kowen	<b>ID241, Impact assessments on people and buildings for hydrogen pipeline explosions</b> Paola Russo, Alessandra De Marco, Fulvio Parisi	<b>ID136, Experimental investigation of unconfined spherical and cylindrical flame propagation in hydrogen-air mixtures</b> Joachim Grune, Karsten Sempert, Mike Kuznetsov, et.al.
15:40	<b>East Foyer</b> Heatlie coffee break		
	<b>East E1</b> <b>Pressure Effects - Modeling and Experiments</b> Chair R. C. Bauwens	<b>Skyway A - Level 1</b> <b>IPHE Session on Safety in Tunnels and in Mining</b> Chair P. Russo	<b>East E3</b> <b>Deflagrations &amp; Detonation 1</b> Chair A. Matsuo
16:00	<b>ID163, Numerical modelling of unconfined and confined hydrogen explosion</b> Pratap Sathiah, Arun K Ampai	<b>ID109 Hydrogen ventilation test facility or underground mining and tunneling</b> Dmitri Bessarabov, Gerhard Human, Faan Oelofse, et.al.	<b>ID135, Evaluation of an improved vented deflagration CFD model against nine experimental cases</b> Ilias C. Tolias, Alexandros G. Venetsanos, Mike Kuznetsov
16:20	<b>ID173, Numerical assessment of hydrogen explosion consequences in mine tunnel</b> Yurii Skob, Mykhaylo Ugrumov, Eduard Granovskiy	<b>ID168, Inhibition of confined hydrogen explosion by inert gases</b> Yanchao Li, Mingshu Bi, Jingjie Ren, et.al.	<b>ID193, Flame propagation near the limiting conditions in a thin layer geometry</b> Fernando Veiga-López, Mike Kuznetsov, Jorge Yanez, et.al.
16:40	<b>ID275, New paradigms in hydrogen explosion modelling using an industrial CFD code</b> Prankul Middha, Steve Howell, Simon Feven	<b>ID187, Numerical simulation of homogenous/inhomogeneous hydrogen-air explosion in a rectangular channel</b> Qiao Wang, Changjian Wang	<b>ID164, Homogeneous and inhomogeneous hydrogen deflagrations in 25 m<sup>3</sup> enclosure</b> Martino Schiavetti, Marco Carcassi
17:00	<b>ID113, Detailed examination of deformations induced by internal hydrogen explosions: Part 1 Experiments</b> Etienne Studer, Sergey Koudriakov, Benjamin Cariteau, et.al.	<b>ID169, Analysis of transient hydrogen release, dispersion and explosion in a tunnel with fuel cell vehicles using All-Speed CFD Code GASFLOW-MPI</b> Yabing Li, Jianjun Xiao, Han Zhang, et.al.	<b>ID165, Inhomogeneous hydrogen deflagrations in the presence of obstacles in 25 m<sup>3</sup> enclosure. Experimental results</b> Martino Schiavetti, Marco Carcassi
17:20	<b>ID114, Detailed examination of deformations induced by internal hydrogen explosions: Part 2 Models</b> Ossama Halim, Etienne Studer, Sergey Koudriakov, et.al.	<b>ID110, Testing, evaluation and development of hydrogen sensors for an underground mining ventilation test facility</b> Gerhard Human, Neels Le Roux, Faan Oelofse, et.al.	<b>ID197, Simulating vented hydrogen deflagrations: improved modelling in the CFD tool Flacs-Hydrogen</b> Melodia Lucas Pérez, Gordon Atanga, Hiskén Helene, et.al.

Time	Wednesday, September 25, 2019		
	<div>Skyway A - Level 1</div> <div>Safety Plenary Chair Andrei Tchouvelev and Marco Carcassi</div>		
8:45	<div>ISO TC 197 Andrei Tchouvelev</div>		
9:10	<div>Center for Hydrogen Safety Nick Barilo</div>		
9:30	<div>HySafe outcome of the Research Priorities Workshop Jay Keller</div>		
10:00	<div>RCS relating to Distribution and Transmission Networks Ian McCluskey and Keith Owen</div>		
10:20	<div>Tunnels and Confined Spaces Chris LaFleur</div>		
10:40	<div>Hydrogen technologies: experiences in rescue and prevention of Italian Fire Corps Marco Cavriani</div>		
11:00	<div>East Foyer</div> <div>Heatlie coffee break</div>		
	<div>East E1</div> <div>Liquid Hydrogen Chair S. Hawksworth</div>	<div>Skyway A - Level 1</div> <div>Regulations, Codes and Standards Chair U. Schmidtchen</div>	<div>East E3</div> <div>Deflagrations &amp; Detonation 2 Chair L. Bauwens</div>
11:20	<div>ID172, Prediction of pressure reduction rate in 30 m<sup>3</sup> liquid hydrogen tank based on experimental and numerical analysis Kazuma Tani, Takehiro Himeno, Yasunori Sakuma, et.al.</div>	<div>ID150, Comparison of regulations codes and standards for hydrogen refueling stations in Japan and France Kento Taneda, Simon Jallais, Elena Vyazmina</div>	<div>ID186, Vented hydrogen-air explosion in a small obstructed rectangular container: effect of the blockage ratio Xing Wang, Changjian Wang, Qiao Wang</div>
11:40	<div>ID240, Hydrogen wide area monitoring of LH2 releases, William Buttner, Jonathan Hall, Philip Hooker, et.al.</div>	<div>ID215, Closing the regulatory gaps and advancing hydrogen infrastructure deployment in Australia Billy Chan</div>	<div>ID149, Numerical study of the detonation benchmark using GASFLOW-MPI Han Zhang, Jianjun Xiao, Mike Kuznetsov, et.al.</div>
12:00	<div>ID137, Status of the pre-normative research project PRESLHY for the safe use of LH2 Thomas Jordan, Simon Jallais, Alexandros Venetsanos, et.al.</div>	<div>ID245, Compliance measurements of fuel cell electric vehicle exhaust William Buttner, Aaron Loselle-Lapointe, Tashi Wischmeyer</div>	<div>ID171, Numerical investigation of detonation in stratified combustible and inert gasses with concentration gradients Shunsuke Shigeoka, Akiko Matsuo</div>
12:20	<div>ID133, Characteristic of cryogenic hydrogen flames from high-aspect ratio nozzles Ethan Hecht, Bikram Roy Chowdhury</div>	<div>ID281, Hydrogen and Fuel Cell Vehicles UN Global Technical Regulation No. 13: Latest Updates Reflecting Heavy Duty Vehicles Nha Nguyen, Livio Gambone</div>	<div>ID189, Self-acceleration of a spherically expanding hydrogen-air flame at elevated pressure Woogyung Kim, Yoshitatsu Sato, Tomoyuki Johzaki, et.al.</div>
12:40	<div>ID175, CFD validation against large scale liquified helium release Alexandros Venetsanos, Stella Giannissi, Christoph Proust</div>	<div>ID228, Challenges in hydrogen RCS' stakeholder engagement in South Africa Brian North, Henrietta Langmi, Ashton Swartbooi</div>	<div>ID190, Detonation dynamics in a curved chamber for an argon diluted hydrogen-oxygen mixture Cyprien Jourdain, Josué Melquizo-Gavilanes, Vicent Rodriguez, Pierre Vidal, Ratiba Zitoun</div>
13:00	<div>East Foyer</div> <div>Lunch</div>		

	<div>East E1</div> <div>Safety in H2 Vehicle 1</div> <div>Chair F. Market</div>	<div>Skyway A - Level 1</div> <div>Communication 1</div> <div>Chair N. Smith</div>	<div>East E3</div> <div>Deflagrations &amp; Detonation 3</div> <div>Chair J. Melguizo Gavilanes</div>
14:00	<b>ID225, Australians' considerations for use of hydrogen in the transport sector</b> Victoria Lambert, Peta Ashworth	<b>ID205, European Hydrogen Safety Panel (EHSP)</b> Iñaki Azkarate, et.al.	<b>ID279, Quantifying the potential consequences of a detonation in a hydrogen jet release,</b> C. Regis Bauwens, Sergey Dorofeev
14:20	<b>ID264, An investigation of mobile hydrogen and fuel cell technology applications</b> Nick Barilo, Angie Dalton, Richard Kallman, et.al.	<b>ID210, Hydrogen for renewable energy export: broadening the concept of hydrogen safety</b> Daniel Roberts, Christopher Munnings, Jenny Hayward, et.al.	<b>ID145, Experimental study on hydrogen/air premixed flame propagation in closed rectangular channels,</b> Xiaobo Sheng, Chao Zhang, Jennifer X Wen, et.al.
14:40	<b>ID179, The study on permissible value of hydrogen gas concentration in purge gas of Fuel Cell Vehicles</b> Koji Yamazaki, Yohsuke Tamura	<b>ID116, HIAD 2.0 - Hydrogen Incident and Accident Database,</b> Daniele Melideo, Pietro Moretto , Jennifer Wen	<b>ID147, Numerical investigation of hydrogen-air deflagrations in a repeated pipe congestion,</b> Vendra C. Madhav Rao, Pratap Sathiah, Jennifer X Wen
15:00	<b>ID230, 3D real time monitoring of H2 in FCV applications</b> Takashi Nohmi, Kenji Satoh, Toshio Mogi, et.al.	<b>ID224, Cautiously optimistic: understanding the Australian public's response to the Hydrogen opportunity</b> Peta Ashworth, Victoria Lambert	<b>ID111, Hydrogen deflagrations in stratified flat layers in the large-scale vented combustion test facility</b> Zhe (Rita) Liang, Lee Gardner, Tony Clouthier, et.al.
15:20	<b>ID125, Unattended hydrogen vehicle fueling challenges and historical context</b> Jennifer Hamilton, Aaron Harris, Jay Keller	<b>ID239, HyP SA - Our safety story</b> Andrew Pym, Kristin Raman, Mark Beach	<b>ID123, Mesh-Independent Large-Eddy simulation with anisotropic adaptive mesh refinement for hydrogen deflagration prediction in closed vessels</b> Ryan Taylor, Clinton P.T. Groth, Rita Liang, et.al.
15:40	<div>East Foyer</div> <div>Heatlie coffee break</div>		
16:00 17:00	<div>Networking opportunities</div>		
18:30	<div>Gala Dinner</div> <div>National Wine Centre</div> <div>doors open at 18:30, dinner from 19:00</div>		

Time	Thursday, September 26, 2019		
	<b>East E1</b>  <b>Nuclear</b> Chair E. A. Reinecke	<b>Skyway A - Level 1</b>  <b>Physical Effects 2</b> Chair P. Benard	<b>East E3</b>  <b>Miscellaneous</b> Chair A. Pigneri
9:30	<b>ID122, Performance tests of catalysts for the safe conversion of hydrogen inside the nuclear waste containers in Fukushima Daiichi</b> Ernie Reinecke, Keisuke Takenaka, Hitomi Ono, et.al.	<b>ID134, Highly resolved Large Eddy Simulation of subsonic hydrogen jets - Evaluation of ADREA-HF code against detailed experiments</b> Ilias C. Tolias, Nektarios Koutsourakis, Alexandros G. Venetsanos	<b>ID261, Practical demonstration of energy storage and sector shifting using renewable energy</b> Bill Ireland
9:50	<b>ID124, A Large-Scale study on the effect of ambient conditions on hydrogen recombiner induced ignition</b> Lee Gardner, Zhe (Rita) Liang, Tony Clouthier, et.al.	<b>ID127, Flow of hydrogen from buried leaks</b> Graham Atkinson, Phillip Hooker, Jonathan Hall, Stuart Haworth	<b>ID130, Tests of the vehicle's powertrain with hydrogen fuel cells at a low temperature</b> Marek Brzezanski, Andrzej Szalek
10:10	<b>ID143, Deflagration-to-detonation transition of H<sub>2</sub>-CO-Air mixtures in a partially obstructed channel</b> Daniel Heilbronn, Christoph Barfuss, Thomas Sattelmayer	<b>ID182, Non-adiabatic under-expanded jet theory for blowdown and fire resistance rating of hydrogen tank</b> Mohammad Dadashzadeh, Sergii Kashkarov, Dmitriy Makarov, et.al.	<b>ID221, Transferring the retail of hydrogen economy and missing safety assurance,</b> Marcus Steel
10:30	<b>ID142, Simulation of deflagration-to-detonation transition of lean H<sub>2</sub>-CO-Air mixtures in obstructed channels</b> Christoph Barfuss, Daniel Heilbronn, Thomas Sattelmayer	<b>ID220, Modelling and numerical simulation of hydrogen jet fires for industrial safety analyses - Comparison with large-scale experiments</b> Kjell Erik Rian	<b>ID153, A GIS-based risk assessment for hydrogen transport: a case study in Yokohama city</b> Hiroki Noguchi, Tatsuro Omachi, Hajime Seya, et.al.
10:50	<b>East Foyer</b> Heatlie coffee break		
	<b>East E1</b>  <b>Gas Blends</b> Chair J. Wen	<b>Skyway A - Level 1</b>  <b>Communication 2</b> Chair N. Smith	<b>East E3</b>  <b>Combustion 1</b> Chair S. Dorofeev
11:20	<b>ID139, Safety and Regulatory challenges of using hydrogen / natural gas blends in the UK</b> Kate Jeffrey, Catherine Spriggs, Stewart McEwen, Philip Hooker, Chris Manson-Whitton	<b>ID243, Delivering a safe, viable hydrogen economy in Australia</b> Rachelle Doyle	<b>ID211, Interaction of hydrogen jets with hot surfaces of various sizes and temperatures</b> Armin Kessler, Sebastian Knapp, Norbert Eisenreich, et.al.
11:40	<b>ID140, Operation of UK gas appliances with hydrogen blended natural gas</b> Mark Pursell, Philip Hooker, Stuart Haworth, Paul McLaughlin, Shane Wilcox, Ian McCluskey	<b>ID226, Communicating leakage risk in the hydrogen economy: lessons already learned from geoeconomy industries</b> Patrick G. Hartley, Linda Stalker, Jennifer Roberts, Leslie Mabon, et.al.	<b>ID214, Autoignition of hydrogen/ammonia blends at elevated pressures and temperatures</b> Michael Evans, Alfonso Chinnici, Paul Medwell, et.al.
12:00	<b>ID209, Assessing the viability of the ACT natural gas distribution network for reuse as a hydrogen distribution network</b> Ed Gaykema, Igor Skryabin	<b>ID238, Safe Hydrogen Fuel Handling and Use for Efficient Implementation - SH2IFT</b> Anders Ødegård, Kees van Wingerden, Nina Kristine Reitan, et.al.	<b>ID170, Self-ignition and flame propagation of pressurized hydrogen released through tubes</b> Yiming Jiang, Xuhai Pan

12:20	<b>ID128, Gas detection of hydrogen/natural gas blends in the gas industry</b> Jonathan Hall, Philip Hooker, Kate Jeffrey	<b>ID242, Early community engagement with hydrogen in Australia</b> Sussan Johnson	<b>ID247, Hot surface ignition in flowing streams of hydrogen-air mixtures</b> Christophe Proust, Habib Kone
12:40	<div>East Foyer</div> <div>Lunch</div>		
	<div>East E1</div> <b>Safety Pressure Vessels</b> Chair J. Keller	<div>Skyway A - Level 1</div> <b>Risk Analysis &amp; Safety Management</b> Chair F. Markert	<div>East E3</div> <b>Combustion 2</b> Chair X. Sheng
13:40	<b>ID131, Effect of the time dependent loading of Type IV cylinders using a multi-scale model</b> Martinus Putra Widjaja, Marco Alves, Mark Mavrogordato, et.al.	<b>ID118, Safety code equivalencies in hydrogen infrastructure deployment</b> William Buttner, Crystal Xie, Carl Rivkin	<b>ID219, Blending ammonia into hydrogen to enhance safety through reduced burning velocity</b> Xinlu Han, Yong He, Yingzu Liu, et.al.
14:00	<b>ID159, Influence of hydraulic sequential tests on the burst strength of Type-4 compressed hydrogen containers</b> Jun-ichi Tomioka, Shunsuke Masuda, Hiroaki Tamura, et.al.	<b>ID152, Characterization of hydrogen transport accidents in Japan based on network theory</b> Hiroki Noguchi, Chi Yung Lam, Masaaki Fuse	<b>ID126, The CALIF3S-P<sup>2</sup>REMICS software: an application to underexpanded hydrogen jet deflagration</b> Laura Gastaldo
14:20	<b>ID158, A study of decrease burst strength on compressed-hydrogen containers by drop test</b> Shunsuke Masuda, Jun-ichi Tomioka, Hiroaki Tamura, et.al.	<b>ID157, The influence of H2 safety research on relevant risk assessment,</b> Federico Ustolin, Guozheng Song, Nicola Paltrinieri, et.al.	<b>ID183, Optimizing mixture properties for accurate laminar flame speed measurement from spherically expanding flame: application to H2/O2/N2/He mixtures</b> Yakun Zhang, Marine Jeanson, Remy Mevel, et.al.
14:40	<b>ID181, Acoustic emission characteristics of used 70 MPa Type IV hydrogen storage tanks during hydrostatic burst tests</b> Dongliang Wang, Binbin Liao, Ange Wen, et.al.	<b>ID188, Towards fire test protocol for hydrogen storage tanks</b> Sergii Kashkarov, Dmitriy Makarov, Vladimir Molkov	<b>ID229, Experiments on the combustion behavior of Hydrogen-Carbon Monoxide-Air mixtures</b> Andreas Friedrich, Gottfried Necker, Anke Vesper, et.al.
15:00	<b>ID200, Safety system design for mitigating risks of intended hydrogen releases from thermally activated pressure relief device of onboard storage,</b> Zhiyong Li, Ke Sun	<b>ID300, ENGIE's approach to HSE design on large scale renewable hydrogen projects for the industry,</b> Alberto Litta Modignani	<b>ID223, Effect of expansion ratio on flame acceleration during hydrogen fueled gas explosions,</b> Jun Yaguchi, Woogyung Kim, Toshio Mogi, et.al.
15:20	<div>East Foyer</div> <div>Heatlie coffee break</div>		
15:40	<div>Skyway A - Level 1</div> <b>Closing Session</b> Stuart Hawksworth, Nick Smith and Marco Carcassi		



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## OTHER CONTRIBUTORS



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