

**2024 SPRING TECHNICAL MEETING
WESTERN STATES SECTION OF THE COMBUSTION INSTITUTE
Hosted by University of Utah – Salt Lake City, UT**

Monday, 4 March 2024

7:30 – 4:00 Registration - Warnock Engineering Building (WEB) Lower Level
7:30 – 8:00 Breakfast - Warnock Engineering Building (WEB) Lower Level
8:00 - 8:20 Welcome Remarks and Plenary Location - Warnock Engineering Building (WEB) L104
Welcome Remarks - David Pershing, President Emeritus and Distinguished Professor of Chemical Engineering, *University of Utah*
 Alex G. Novoselov, Local Host, *The University of Utah*

8:20 – 9:20 Plenary Lecture: Jacqueline Chen, Senior Scientist, Sandia National Laboratory
Title: The convergence of exascale computing and data science towards zero-carbon fuels for power generation
Session Chair: J.C. Sutherland, *University of Utah*

9:20 – 9:30	Transition to Morning Sessions	
	Biomass Combustion and Gasification I Warnock Engineering Building (WEB) L104 Session Chair: D. Wagner	Chemical Kinetics I Warnock Engineering Building (WEB) L105 Session Chair: N. Labbe
9:30 – 9:50	1A01: Combustion kinetics and evolved gas analysis of lignocellulose <i>D. Stucker, K. Kumar</i>	1B01: Gasification of coal/plastic mixtures: Fundamental studies in a laminar entrained-flow reactor <i>A. Kareem, K.J. Whitty</i>
9:50 – 10:10	1A02: Development of a reactor network model for entrained flow gasification <i>E.C. Monson, B.R. Adams, A. Fry, K. Crapo</i>	1B02: Are carbenes really important in oxymethylene ether decomposition? <i>J. Sampathkumar, P. Shah, T. Chatterjee, K. Lockwood, N. Labbe</i>
10:10 – 10:30	1A03: Demonstrating the feasibility of biomass pyrolysis liquid, coal, plastic oil mixtures for entrained flow gasification <i>L. Hughey, D.R. Wagner, K.J. Whitty</i>	1B03: Comparison of the thermal destruction of C1 and C2 fluorine/chlorine homologues in a pilot-scale research furnace: Modeling and experiments <i>M. Denison, D. Swensen, M. Cremer, B. Van Otten, J. Wendt, J. Krug, G. Dildine, W. Roberson, E. Shields, J. Mattila, P. Lemieux, W. Linak, P. Burnette, S. McDonald, C. Whitfield</i>
10:30 – 10:50	1A04: Investigating the carbonation potential of calcined limestone (CaO) in the presence of steam and syngas <i>S. Abu Sufyan, K.J. Whitty, M.M. Nigra</i>	1B04: Procedure and analysis methods for hydrogen isotopic reactivity analysis <i>J. Wilde, L. Whitesides, E. Saxey, A. Clark, M. Argyle, L. Baxter</i>
10:50 – 11:10	BREAK - Warnock Engineering Building (WEB) Lower Level	

	Biomass Combustion and Gasification II Warnock Engineering Building (WEB) L104 Session Chair: D. Wagner	Chemical Kinetics II Warnock Engineering Building (WEB) L105 Session Chair: N. Labbe
11:10 – 11:30	1A05: Performance of an entrained-flow gasifier using biomass-derived liquid <i>D.R. Wagner, L. Hughey, K. Whitty</i>	1B05: Isotopic effects on hydrogen combustion and flame speeds <i>E.B. Saxey, J.C. Wilde, A.E. Clark, L.T. Whitesides, M.D. Argyle, L.L. Baxter</i>
11:30 – 11:50	1A06: Thermogravimetry and evolved gas analysis during the pyrolysis of lignocellulosic biomass <i>D. Stucker, K. Kumar</i>	1B06: Aspects of fundamental reaction kinetics and legacy combustion properties in data-assimilated combustion reaction model development <i>W. Dong, Y. Zhang, G.P. Smith, H. Wang</i>
11:50 – 12:10	1A07: Simulation of non-structural carbohydrates in live vegetative fuel <i>M.E. Gee, D. Behnoudfar, K.E. Niemeyer, D.L. Blunck</i>	1B07: The intricate transport and kinetic structure of hydrogen flames <i>J. Wilde, L. Whitesides, E. Saxey, A. Clark, M. Argyle, L. Baxter</i>
12:10 – 12:30	1A08: Pressurized steam gasification of pine – Inhibition by hydrogen and carbon monoxide <i>J. Kim, C. Zhou, K. Engvall, K.J. Whitty</i>	1B08: Comparison of chemical mechanisms for simulation of hydrogen/ammonia combustion <i>J.S. Lee, A.G. Novoselov</i>
12:30 – 2:00	LUNCH – On your own Women in Combustion Lunch – Kennecott Mechanical Engineering (MEK) 3350	
	Environmental Aspects of Combustion Warnock Engineering Building (WEB) L104 Session Chair: Y. Zhao	Fires and Fire Safety Warnock Engineering Building (WEB) L105 Session Chair: A.J. Josephson
2:00 – 2:20	1A09: Hydrogen blending into residential appliances in the New Mexico field demonstration <i>Y. Zhao, M. Bushell, P. Glanville, J. McNelis, A. Serrano de Rivera</i>	1B09: TG-FTIR-GC study of pyrolysis of live foliage <i>M.W. Andersen, D.L. Blunck, C.L. Hagen</i>
2:20 - 2:40	1A10: A gradient of gas composition in a wildland fire flame <i>D.R. Weise, T.J. Johnson, T.L. Myers, W.M. Hao, S. Baker, T.H. Fletcher, J. Palarea-Albaladejo, M. Alizadeh</i>	1B10: The parametric analysis of a new computer vision algorithm for the prediction of the fire rate of fire spread in laboratory scale <i>E. Ameril, K. Awayan, C. Duran, P. Mendoza Rueda, D. Sepulveda, D.C. Abrenica, J. Cobian-Iniguez</i>
2:40 - 3:00	1A11: Catalytic combustion of hydrogen/methane fuel blends <i>Z. Ferman, B. Padak</i>	1B11: Ignition and burning behavior of live and dead thermally thick woody fuels <i>N. Gardner, D.L. Blunck</i>
3:00 – 3:20	1A12: CFD study of particle-laden flow: Application to PM sensors <i>L. Quarshie, D. Webb, R.S. Lewis, M.R. Jones</i>	1B12: Predicting fire-dependent and dynamic particulate emission factors <i>A.J. Josephson</i>
3:20 – 3:40	1A13: Towards prediction of ash deposition rates from combustion of a wide variety of fossil and biomass solid fuels <i>X. Li, J.O.L. Wendt</i>	1B13: The influence of lignin in wildland fuels combustion – An experimental study and TG analysis <i>S. Saha, J. Cobian-Iniguez</i>
3:40 - 4:00	BREAK - Warnock Engineering Building (WEB) Lower Level	

	Soot and Nanomaterials Warnock Engineering Building (WEB) L104 Session Chair: D. Lignell	Laminar and Turbulent Flames Warnock Engineering Building (WEB) L105 Session Chair: V.M. Sauer
4:00 - 4:20	1A14: Formation of soot clusters from hydrocarbons under pyrolysis conditions <i>D.K. Eyice, T. Strickland, J. Manin, K. Wan, F.J. Guzman</i>	1B14: Impact of Soret diffusion on the effective species Lewis number model in premixed turbulent flames <i>M.X. Yao, A. Baumgart, G. Blanquart</i>
4:20 - 4:40	1A15: Integration of Sootlib into one-dimensional unsteady flames <i>J. Berryhill, J. Porter, K. Spinti, D. Lignell</i>	1B15: Effect of oscillating strain rates on premixed counterflow flame <i>J.G. Rivera Lizarralde, A. Potnis, A. Saha</i>
4:40 - 5:00	1A16: Soot distribution and transport in droplet combustion experiments on the International Space Station <i>C.L. Vang, B.D. Shaw</i>	1B16: Experimental evaluation of swirl-venturi rapidly mixed tubular burners for hydrogen combustion <i>V.M. Sauer, J. Vasquez, J. Sanchez</i>
6:00	Reception – Alumni House Ballroom Early Career Mixer - Templin Family Brewing 8pm	

Tuesday, 5 March 2024

7:30 – 12:00 **Registration** - Warnock Engineering Building (WEB) Lower Level

7:30 – 8:00 **Breakfast** - Warnock Engineering Building (WEB) Lower Level

8:00 - 8:05 **Opening Remarks and Plenary Location** - Warnock Engineering Building (WEB) L104

8:05 – 9:05 **Plenary Lecture: Bret Windom, Associate Professor, Colorado State University**

Title: The combustion science and engineering of next generation large engines

Session Chair: D. Lignell, Brigham Young University

9:05 – 9:15	Transition to Morning Sessions	
	Internal Combustion, Gas Turbines, and Rocket Engines Warnock Engineering Building (WEB) L104 Session Chair: V. McDonell	Numerical Methods and Machine Learning Techniques Applied to Combustion Warnock Engineering Building (WEB) L105 Session Chair: B. Perry
9:15 – 9:35	2A01: Numerical investigation of mixture formation at different start of injection timings for a direct injection LPG engine <i>R. Churchill, B. Windom</i>	2B01: Ensuring $\Sigma sYs = 1$ in transport of species mass fractions <i>A. Baumgart, G. Blanquart</i>
9:35 - 9:55	2A02: Direct injection optimization of a heavy-duty propane engine using computational and experimental methods <i>T. Fosudo, J.F. Rodriguez, D. Olsen</i>	2B02: Physics-informed neural network simulations of premixed flames in counterflow, Bunsen, and Hele-Shaw configurations <i>B.L. Cohen, Z. Zhou, P.D. Ronney</i>
9:55 - 10:15	2A03: The performance of a range of alcohols blended with military jet fuel in a diesel engine <i>J. Cowart, D. Luning Prak</i>	2B03: Machine learning model development based on real-time data and its application to control fire-side corrosion at a cycling PC power plant <i>H.-S. Shim, Z. Zhan, A. Chiodo, J. Tuttle</i>
10:15 - 10:35	2A04: Heat transfer analysis of regeneratively cooled bi-propellant rocket engines and test stand development <i>B. Windom, D. Cornett, J. Roberts</i>	2B04: Challenges of reduced-order modeling with reconstruction aware neural networks <i>D. Littlewood, J.C. Sutherland</i>
10:35 - 10:55	2A05: An assessment of the NO_x emissions performance of hydrogen Lean Direct Injected (LDI) nozzles in comparison to a fully pre-mixed system <i>M. Overbaugh, V. McDonell</i>	2B05: Modeling ember behavior and accumulation patterns during a wildfire <i>K. Gellerman, T. Banerjee, Y.-C. Chien</i>
10:55 – 11:15	BREAK - Warnock Engineering Building (WEB) Lower Level	

	Diagnostics / Detonations, Explosions, and Supersonic Combustion Warnock Engineering Building (WEB) L104 Session Chair: A. Novoselov
11:15 – 11:35	2A06: Experimental observation of the SO₃/H₂SO₄ equilibrium in flue gas conditions with continuous monitoring methods for SO₃ <i>A. Biasioli, J. Kriesel, I. Dunayevskiy, R. Himes, L. Muzio, J. Santamaria, D. Dunn-Rankin, Y.-C. Chien</i>
11:35 – 11:55	2A07: Imaging pyrometry to estimate LOX-LNG impact explosion temperatures <i>J. Stock, B. Lambert, R. Reveles, M. Bangham</i>
11:55 – 12:15	2A08: Analysis on analog system of detonation with two step chemical reaction model <i>Y. Sun</i>
12:15	Adjourn Industrial Combustion and Gasification Research Facility Tour – 1:30 And mark your calendars now for the 14th United States National Combustion Meeting 16 March to 19 March 2025 Boston, Massachusetts

2024 WSSCI Fall Technical Meeting Author List

<i>Author</i>	<i>Paper #</i>	<i>Author</i>	<i>Paper #</i>	<i>Author</i>	<i>Paper #</i>	<i>Author</i>	<i>Paper #</i>
Abrenica, D.C.	1B10	Ferman, Z.	1A11	Nigra, M.M.	1A04	Vasquez, J.	1B16
Abu Sufyan, S.	1A04	Fletcher, T.H.	1A10	Novoselov, A.G.	1B08	Wagner, D.R.	1A03, 1A05
Adams, B.R.	1A02	Fosudo, T.	2A02	Olsen, D.	2A02	Wan, K.	1A14
Alizadeh, M.	1A10	Fry, A.	1A02	Overbaugh, M.	2A05	Wang, H.	1B06
Ameri, E.	1B10	Gardner, N.	1B11	Padak, B.	1A11	Webb, D.	1A12
Andersen, M.W.	1B09	Gee, M.E.	1A07	Palarea-Albaladejo, J.	1A10	Weise, D.R.	1A10
Argyle, M.D.	1B04, 1B05, 1B07	Gellerman, K.	2B05	Porter, J.	1A15	Wendt, J.O.L.	1B03, 1A13
Awayan, K.	1B10	Glanville, P.	1A09	Potnis, A.	1B15	Whitesides, L.T.	1B04, 1B05, 1B07
Baker, S.	1A10	Guzman, F.J.	1A14	Quarshie, L.	1A12	Whitesides, L.T.	1B05
Banerjee, T.	2B05	Hagen, C.L.	1B09	Reveles, R.	2A07	Whitty, K.J.	1B01, 1A03, 1A04, 1A05, 1A08
Bangham, M.	2A07	Hao, W.M.	1A10	Rivera Lizarralde, J.G.	1B15	Wilde, J.C.	1B04, 1B05, 1B07
Baumgart, A.	1B14, 2B01	Himes, R.	2A06	Roberts, J.	2A04	Windom, B.	2A01, 2A04
Baxter, L.L.	1B04, 1B05, 1B07	Hughey, L.	1A03, 1A05	Rodriguez, J.F.	2A02	Yao, M.X.	1B14
Behnoudfar, D.	1A07	Johnson, T.J.	1A10	Ronney, P.D.	2B02	Zhan, Z.	2B03
Berryhill, J.	1A15	Jones, M.R.	1A12	Saha, A.	1B15	Zhang, Y.	1B06
Biasioli, A.	2A06	Josephson, A.J.	1B12	Saha, S.	1B13	Zhao, Y.	1A09
Blanquart, G.	1B14, 2B01	Kareem, A.	1B01	Sampathkumar, J.	1B02	Zhou, C.	1A08
Blunck, D.L.	1A07, 1B09, 1B11	Kim, J.	1A08	Sanchez, J.	1B16	Zhou, Z.	2B02
Bushell, M.	1A09	Kriesel, J.	2A06	Santamaria, J.	2A06		
Chatterjee, T.	1B02	Kumar, K.	1A01, 1A06	Sauer, V.M.	1B16		
Chien, Y.-C.	2B05, 2A06	Labbe, N.	1B02	Saxey, E.B.	1B04, 1B05, 1B07		
Chiodo, A.	2B03	Lambert, B.	2A07	Sepulveda, D.	1B10		
Churchill, R.	2A01	Lee, J.S.	1B08	Serrano de Rivera, A.	1A09		
Clark, A.E.	1B04, 1B05, 1B07	Lewis, R.S.	1A12	Shah, P.	1B02		
Cobian-Iniguez, J.	1B10, 1B13	Li, X.	1A13	Shaw, B.D.	1A16		
Cohen, B.L.	2B02	Lignell, D.	1A15	Shim, H.-S.	2B03		
Cornett, D.	2A04	Littlewood, D.	2B04	Smith, G.P.	1B06		
Cowart, J.	2A03	Lockwood, K.	1B02	Spinti, K.	1A15		
Crapo, K.	1A02	Luning Prak, D.	2A03	Stock, J.	2A07		
Cremer, M.	1B03	Manin, J.	1A14	Strickland, T.	1A14		
Denison, M.	1B03	McDonell, V.	2A05	Stucker, D.	1A01, 1A06		
Dong, W.	1B06	McNelis, J.	1A09	Sun, Y.	2A08		
Dunayevskiy, I.	2A06	Mendoza Rueda, P.	1B10	Sutherland, J.C.	2B04		
Dunn-Rankin, D.	2A06	Monson, E.C.	1A02	Swensen, D.	1B03		
Duran, C.	1B10	Muzio, L.	2A06	Tuttle, J.	2B03		
Engvall, K.	1A08	Myers, T.L.	1A10	Van Otten, B.	1B03		
Eyice, D.K.	1A14	Niemeyer, K.E.	1A07	Vang, C.L.	1A16		

Conference Locations and Map

Conference Venue: Warnock Engineering Building (WEB)

- Main events on lower level (see map for entrance)
- All talks in WEB L104 and WEB L105
- Registration outside WEB L103
- Breakfast and Breaks outside WEB L103

Conference Parking: Lot 39, Merrill Engineering

- Parking must be paid for by scanning QR code available at parking lot, or by texting ULOT39 to 25023.
- \$3 per hour, \$30 per day

Women in Combustion Lunch: Kennecott Mechanical Engineering Building (MEK) 3350

- Walk west from WEB, across bridge to enter MEK (see dashed blue path)

Banquet Hall: Alumni House



Lunch Locations and Map

There is a Women in Combustion Lunch on Monday. If you are not participating, then lunch is on your own. A few of the closest recommendations are shown on the map to the right.

(A) 1300 East between 200 South and 300 South

- The Pie Pizzeria
- Subway
- B&D Burger
- Osteria Amore
- Indochine Vietnamese Bistro
- Rio Grande Café
- Publik Eds (coffee)

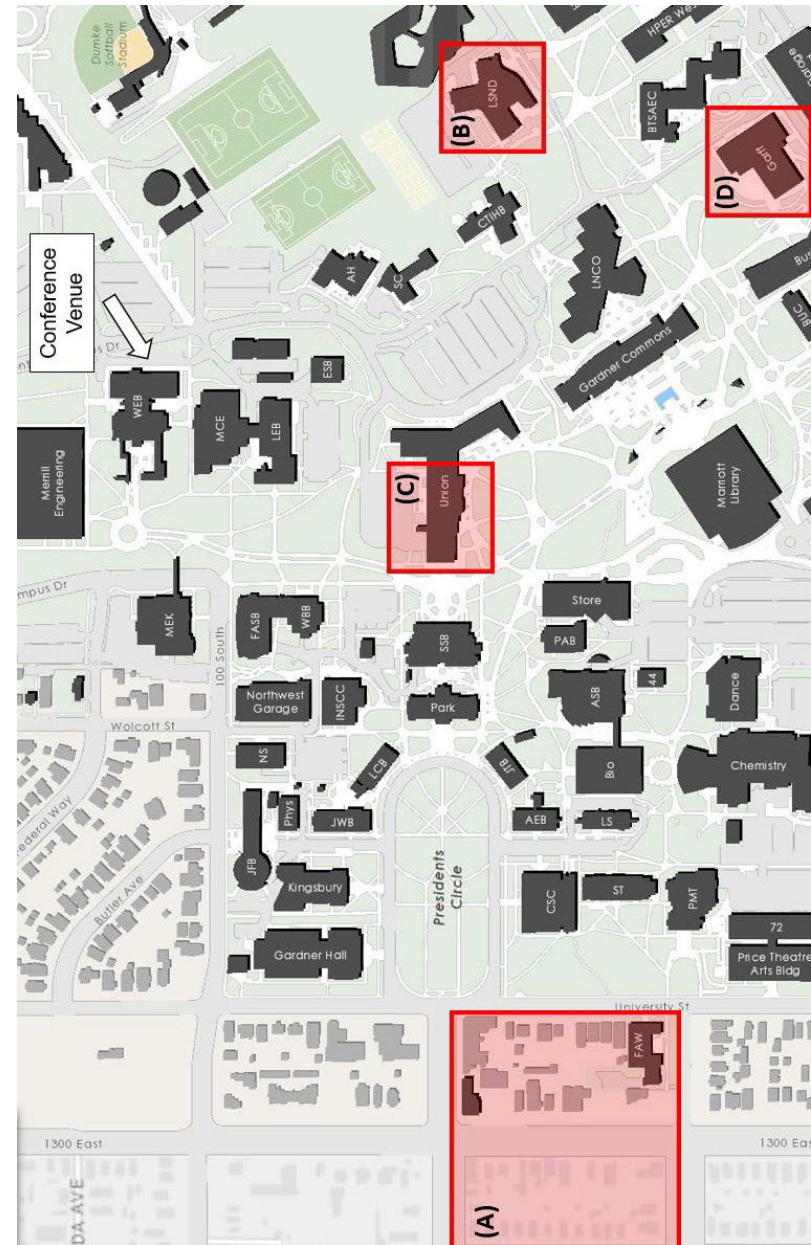
(B) Miller Café at Lassonde Studios

- Basic grill food

(C) Hive Express at Union Building

- Pizza and premade sandwiches/snacks

(D) Greek Food at Garff Building



Off-Campus Events

Early Career Mixer: Monday, March 4th, 8:00pm

Templin Family Brewing (TF Brewing, 936 S 300 W, Salt Lake City, UT 84101)

Lab tour: Tuesday, March 5th, 1:30pm

Industrial Combustion and Gasification Research Facility (870 S 500 W, Salt Lake City, UT 84101)

Facility Director: Kevin Whitty

<https://www.icgrf.utah.edu/>

