



*The 2022 Spring Hybrid Meeting of the
Western States Section of The Combustion Institute*

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**2022 SPRING TECHNICAL MEETING
WESTERN STATES SECTION OF THE COMBUSTION INSTITUTE
Stanford University – Stanford, CA**

Monday, 21 March 2022

7:30 – 4:00 Registration: Basement of Building 380 (marked on map)

7:30 – 8:00 Breakfast: Outside Patio of Building 380 (marked on map)

8:00 – 8:15 Welcome Address in 420-041

Welcome Remarks: Dr. Ellen Kuhl, Walter B. Reinhold Professor in the School of Engineering

Robert Bosch Chair and Professor of Mechanical Engineering, Stanford University

8:15 – 9:15 Plenary Lecture in 420-041: Dr. Nicole Labbe, University of Colorado at Boulder

Title: *Next Generation Microreactors for Rapid Reaction Speciation Data*

Session Chair: Name, Affiliation

Transition to Morning Sessions			
9:15 – 9:25	Turbulent and Laminar Flames 420-041 Session Chair: C. Wei	Detonations, Explosions, and Supersonic Combustion I 380X Session Chair: M. Hajilou	Internal Combustion Engines I 380Y Session Chair: TBD
9:25 – 9:45	1A01: Using tabulated chemistry to capture non-unity Lewis number effects in turbulent premixed flames <i>M.X. Yao, P. Samimy, G. Blanquet</i> California Institute of Technology	1B01: Toward fidelity-adaptive simulation of a cavity-stabilized scramjet combustor <i>M. Bonanni, M. Ihme</i> Stanford University	1C01: Comparative analysis of a spark-ignited CFR engine operation on compressed natural gas and liquefied petroleum gas at stoichiometric conditions <i>T. Fosudo, T. Kar, B. Windom, D. Olsen</i> Colorado State University
9:45 – 10:05	1A02: Turbulent flame propagation of multi-component gasoline surrogate fuel <i>B.S. Soriano, T.M. Nguyen, J.H. Chen</i> Sandia National Laboratories	1B02: Large eddy simulation of a rotating detonation rocket engine <i>G. Vignat, D. Brouzet, M. Bonanni, M. Ihme</i> Stanford University	1C02: Effect of fuel composition on spark-ignited engine combustion with LPG: Experimental and numerical investigations <i>T. Kar, T. Fosudo, A. Marchese, B. Windom, D.B. Olsen</i> Colorado State University
10:05 – 10:25	1A03: Vortex breakdown in swirling Burke-Schumann flames <i>B.W. Keeton, K.K. Nomura, A.L. Sánchez, F.A. Williams</i> University of California San Diego	1B03: Detonation propagation in curved channels: A geometric modeling case study <i>X. Shi¹, R.J. Hencel², J. Crane³, M.L. Fotia², H. Wang¹</i> ¹ Stanford University ² Innovative Scientific Solutions Inc. ³ Queen's University	1C03: Impact of oxygen and carbon dioxide levels on combustion under Argon Power Cycle conditions <i>G. Beardsell¹, D. Bestel¹, D. Kozarac¹, M. Sierra Aznar^{1,2}, J.-Y. Chen², R.W. Dibble^{1,2}</i> ¹ Noble Thermodynamic Systems, Inc. ² UC Berkeley

	Turbulent and Laminar Flames 420-041 Session Chair: C. Wei	Detonations, Explosions, and Supersonic Combustion I 380X Session Chair: M. Hajilou	Internal Combustion Engines I 380Y Session Chair: TBD
10:25 – 10:45	1A04: Experimental evaluation of double Tsuji flame dimensions <i>J.A. Barbosa¹, J.C. de Andrade¹, M.P. Severino², V.M. Sauer³, F.F. Fachini¹</i> ¹ <i>Instituto Nacional de Pesquisas Espaciais</i> ² <i>Universidade de São Paulo</i> ³ <i>California State University Northridge</i>	1B04: Study of detonation structures by solving the spatially-filtered Euler equations <i>A. Baumgart, G. Blanquart</i> <i>California Institute of Technology</i>	1C04: Physical and chemical properties of extended-alkyl oxymethylene ethers for compression ignition fuel use <i>S.P. Lucas¹, A. Gilbert¹, F.L. Chan¹, J. Luecke², J. Zhu³, C. McEnally³, B. Windom¹</i> ¹ <i>Colorado State University</i> ² <i>National Renewable Energy Laboratory</i> ³ <i>Yale University</i>
10:45 – 11:00	BREAK		
	Turbulent Flames 420-041 Session Chair: V. Sauer	Numerical Methods and Machine Learning Techniques Applied to Combustion I 380X Session Chair: A. Ferris	Internal Combustion Engines II 380Y Session Chair: D. Olsen
11:00 – 11:20	1A05: Numerical simulation of Ammonia/Air non-premixed turbulent combustion in porous media <i>G. Ponce, K.R. Anderson</i> <i>California State Polytechnic University</i>	1B05: Training on lossy compressed data in combustion machine learning <i>W.T. Chung, M. Ihme</i> <i>Stanford University</i>	1C05: Simulations of combustion chamber outflow configurations for a hybrid rocket motor <i>A.T. Carroll¹, C. Dhandapani¹, G. Blanquart¹, J. Rabinovitch²</i> ¹ <i>California Institute of Technology</i> ² <i>Stevens Institute of Technology</i>
11:20 – 11:40	1A06: Flame-flame interactions in premixed hydrocarbon flame with varying Reynolds number <i>S. Trivedi¹, A. Attili², R.S. Cant¹</i> ¹ <i>University of Cambridge</i> ² <i>University of Edinburgh</i>	1B06: Optimal state estimation by Ensemble Kalman Filter for shock tube simulation in n-heptane/iso-octane surrogate mixture <i>S. You¹, D. Barajas-Solano², D. Tartakovsky³, D. Brouzet¹, M. Ihme¹</i> ¹ <i>Stanford University</i> ² <i>Pacific Northwest National Laboratory</i> ³ <i>Stanford University</i>	1C06: High fidelity simulations of supercritical CO₂ based oxy-combustion with non-ideal equation of state <i>O.A. Doronina, B.A. Perry, S. Yellapantula</i> <i>National Renewable Energy Laboratory</i>
11:40 – 12:00	1A07 (Virtual): Fractal characteristics of premixed ammonia/hydrogen/nitrogen flames in intense sheared turbulence at different pressures <i>M. Rieth¹, A. Gruber², J.H. Chen¹</i> ¹ <i>Sandia National Laboratories</i> ² <i>SINTEF Energy Research</i>	1B07: Predicting physiochemical properties using molecular descriptors and machine learning models <i>A.E. Comesana¹, T.T. Huntington^{1,2}, C.D. Scown^{1,2,4}, K.E. Niemeyer³, V.H. Rapp¹</i> ¹ <i>Lawrence Berkeley National Laboratory</i> ² <i>Joint BioEnergy Institute</i> ³ <i>Oregon State University</i> ⁴ <i>University of California Berkeley</i>	1C07 (Virtual): Initial measurements with a miniature, portable solid fuel ramjet slab burner <i>J. Kalman, A. Guerra</i> <i>California State University Long Beach</i>

	Turbulent Flames 420-041 Session Chair: V. Sauer	Numerical Methods and Machine Learning Techniques Applied to Combustion I 380X Session Chair: A. Ferris	Internal Combustion Engines II 380Y Session Chair: D. Olsen
12:00 – 12:20	1A08 (Virtual): Effect of momentum ratio on methane jet diffusion flames in crossflow <i>S. Simons-Wellin, C.B. Lapointe, S. Coburn, S. Sheppard, A. Makowiecki, J.F. Glusman, J.W. Daily, J.A. Farnsworth, G.B. Rieker, P.E. Hamlington</i> <i>University of Colorado</i>	1B08 (Virtual): Monitoring catalysts synthesis using real-time emission spectroscopy and advanced machine learning models <i>C. Wang, B. Ko, M.O. Najimu, E. Sasmaz</i> <i>University of California Irvine</i>	1C08 (Virtual): Characterization of a commercial 200kW recuperated gas turbine operated on mixtures of hydrogen and natural gas <i>W. Villatoro, V. McDonell</i> <i>University of California Irvine</i>
12:20 – 13:45	LUNCH Women in Combustion Luncheon: 420-041 Featuring Invited Guest Speaker Jeanette Borzo “Unleash your Inner Genius: How to Get More of the Professional Success We Crave”		
	Fire and Fire Safety I 420-041 Session Chair: S. Adusumilli	Diagnostics 380X Session Chair: F. Di Sabatino	Novel Combustion Systems 380Y Session Chair: K. Anderson
13:45 – 14:05	1A09: Comparing the combined effects of ambient pressure and external heat flux on flame spread rate behavior in vertical PMMA cylinders <i>C. Liveretou¹, C. Scudiere¹, M. Thomsen², C. Fernandez-Pello¹, M. Gollner¹, S. Olson³, P. Ferkul³</i> ¹ <i>University of California - Berkeley</i> ² <i>Universidad Adolfo Ibáñez</i> ³ <i>NASA Glenn Research Center</i>	1B09: Schlieren and CH*-emission imaging of autoignition through the side walls of a round shock tube <i>A.J. Susa, R.K. Hanson</i> <i>Stanford University</i>	1C09: Performance of tankless and storage water heaters operated on mixtures of hydrogen and natural gas <i>Y. Zhao, V. McDonell</i> <i>University of California Irvine</i>
14:05 - 14:25	1A10: The effect of enclosure dimensions on fire whirl formation and emissions <i>J.L. Dowling, M. Hajilou, M.J. Gollner</i> <i>University of California Berkeley</i>	1B10: Quantitative volumetric laser absorption imaging of flame thermochemistry exploiting line-mixing effects of methane <i>C. Wei¹, K.K. Schwarm¹, D.I. Pineda², R.M. Spearrin¹</i> ¹ <i>University of California Los Angeles</i> ² <i>The University of Texas at San Antonio</i>	1C10: Hydrocarbon ignition on high surface area pt-electroplated wires <i>Y. Shi¹, J.J. Whalen¹, P.D. Ronney²</i> ¹ <i>University of Southern California</i> ² <i>Pasadena Bioscience Collaborative</i>
14:25 - 14:45	1A11 (Virtual): Parametric study of anisotropic thermal conductivity of decomposing carbon fiber epoxy composites <i>G.B. Anleu¹, J.C. Hewson¹, M.W. Kury¹, J.P. Hidalgo², R.M. Hadden³, S.N. Scott¹</i> ¹ <i>Sandia National Laboratories</i> ² <i>The University of Queensland</i> ³ <i>The University of Edinburgh</i>	1B11: Turbulence-driven bias in time-averaged laser absorption tomography of correlated thermochemical fluctuations <i>C. Wei¹, N. Perakis^{2,3}, D.I. Pineda⁴, M. Ihme², R.M. Spearrin¹</i> ¹ <i>University of California Los Angeles</i> ² <i>Stanford University</i> ³ <i>Technical University of Munich</i> ⁴ <i>The University of Texas at San Antonio</i>	1C11: Numerical modeling of heat-recirculating combustors: Geometrical and chemical effects <i>P. Bhuripanyo, P. Ronney</i> <i>University of Southern California</i>

	Fire and Fire Safety I 420-041 Session Chair: S. Adusumilli	Diagnostics 380X Session Chair: F. Di Sabatino	Novel Combustion Systems 380Y Session Chair: K. Anderson
14:45 - 15:05	1A12 (Virtual): Numerical study on the influence of chimney effect on fire behavior of rainscreen façades <i>A. Sharma^{1,2}, K.B. Mishra²</i> ¹ <i>Case Western Reserve University</i> ² <i>Indian Institute of Technology Roorkee</i>	1B12: A mid-infrared laser absorption diagnostic for CO and temperature measurements in first-stage ignition <i>S. Clees, R. Choudhary, V. Boddapati, R.K. Hanson</i> <i>Stanford University</i>	1C12 (Virtual): Performance of bi-metallic Cu-Mn oxygen carrier for chemical looping combustion with oxygen uncoupling in presence of SO₂ <i>T. Barua, M.H. Talebi, B. Padak</i> <i>University of California Irvine</i>
15:05 - 15:25	1A13 (Virtual): Initial investigation of carbon dioxide hydrate fire extinguishment <i>E. Jeon, G.S. Tahim, N. Saeidi, Y.C Chein</i> <i>University of California Irvine</i>	1B13 (Virtual): Time-resolved mass loss measurements of composite materials subjected to radiant heating <i>C. Winters, D. Roybal, T. Fitch, J. Engerer</i> <i>Sandia National Laboratories</i>	1C13 (Virtual): Simulations of low Mach number reactive flows coupled with electric fields <i>L. Esclapez¹, M. Day¹, J. Bell²</i> ¹ <i>National Renewable Energy Laboratory</i> ² <i>Lawrence Berkeley National Laboratory</i>
15:25 - 15:40	BREAK		
	Fire and Fire Safety II 420-041 Session Chair: E. Belmont	Chemical Kinetics 380X Session Chair: X. Shi	Heterogeneous Combustion 380Y Session Chair: D. Brouzet
15:40 - 16:00	1A14: A physics-based ignition model with detailed chemical kinetics with application to live fuel burning studies <i>D. Behnoudfar, K.E. Niemeyer</i> <i>Oregon State University</i>	1B14: Ignition delay time measurements and model improvements of syngas with H₂S in supercritical CO₂ systems <i>P. Biswas, J. Shao, R. Choudhary, D.F. Davidson, R.K. Hanson</i> <i>Stanford University</i>	1C14: Analysis of the hot surface ignition limits of a wall-stagnating fuel spray <i>D. Mohaddes, M. Ihme</i> <i>Stanford University</i>
16:00 - 16:20	1A15: RADLIB radiative property library for combustion simulations <i>D.O. Lignell, V.B. Stephens, I. Wheeler, S. Jensen</i> <i>Brigham Young University</i>	1B15: A theory based low temperature ignition mechanism for 2-butanol <i>K.S. Lockwood¹, S.F. Ahmed², T.D. Foust², N.J. Labbe¹</i> ¹ <i>University of Colorado Boulder</i> ² <i>National Renewable Energy Laboratory</i>	1C15: Evaluation of the Nusselt number for a fluid sphere in Stokes flow <i>B.D. Shaw, C.L. Vang</i> <i>University of California, Davis</i>
16:20 - 16:40	1A16: Uncertainty analysis for chemical kinetic parameters and thermophysical properties in smoldering combustion of wildland fuels <i>W.J. Jayasuriya, K.E. Niemeyer</i> <i>Oregon State University</i>	1B16: Towards HyChem modeling of kinetics of distillate fuels in the NTC regime <i>R. Choudhary¹, V. Boddapati¹, S. Clees¹, P. Biswas¹, J. Shao^{1,2}, D.F. Davidson¹, R.K. Hanson¹</i> ¹ <i>Stanford University</i> ² <i>Beijing Institute of Technology</i>	1C16: An analysis of the required scalar dissipation rate and minimum particle size for MILD coal combustion <i>H. Zhou, J.C. Sutherland</i> <i>University of Utah</i>

	Fire and Fire Safety II 420-041 Session Chair: E. Belmont	Chemical Kinetics 380X Session Chair: X. Shi	Heterogeneous Combustion 380Y Session Chair: D. Brouzet	
16:40 - 17:00	1A17 (Virtual): Simulations of large-scale wildfire scenarios using Tensorflow compute architectures <i>Q. Wang¹, M. Ihme^{1,2}, Y.-F. Chen¹, J. Anderson¹</i> ¹ <i>Google</i> ² <i>Stanford University</i>	1B17: Development of error-controlled compact mechanisms using reduction and optimization <i>G. Litrico, K. Puduppakkam, C. Naik, E. Meeks</i> <i>ANSYS Inc.</i>	1C17: HOMO-LUMO gaps of large polycyclic aromatic hydrocarbons and their implication on the quantum confinement behavior of flame-formed carbon nanoparticles <i>N. Kateris, A.S. Jayaraman, H. Wang</i> <i>Stanford University</i>	
17:00 - 17:20	1A18 (Virtual): Wind effects on smoldering behavior of simulated wildland fuels <i>J. Cobian-Iñiguez^{1,2}, H. Xiong^{2,3}, C. Liveretou², L. Carmignani², F. Richter², C. Fernandez-Pello², M. Gollner², S. Stephens², M. Finney⁴</i> ¹ <i>University of California, Merced</i> ² <i>University of California, Berkeley</i> ³ <i>University of Science and Technology, China</i> ⁴ <i>US Forest Service</i>			
16:45 - 17:45	Special Session: Exponent, Inc.: Engineering and Scientific Consulting - Information Session Location: 380F			
18:00 – 20:00	Reception – Paul Brest Hall			
20:00	Young Researcher Mixer – Treehouse			
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Tuesday, 22 March 2022

7:30 – 12:00 Registration: Basement of Building 380 (marked on map)

7:30 – 8:00 Breakfast: Outside Patio of Building 380 (marked on map)

8:00 – 8:05 Opening Announcements in 420-041

8:05 – 9:05 Plenary Lecture in 420-041: Dr. Michael Gollner, U.C. Berkeley

Title: *The Role of Combustion in Wildland Fire Science*

Session Chair: D. Blunck, Oregon State University

9:05 – 9:15

Transition to Morning Sessions

	Fire and Fire Safety III 420-041 Session Chair: D. Lignell	Numerical Methods and Machine Learning Techniques Applied to Combustion II 380X Session Chair: TBD	Internal Combustion Engines III 380Y Session Chair: B. Windom
9:15 – 9:35	2A01: Flammability limits of cellulose powder under varying oxygen, heating and wind conditions <i>P. Garg, I. Shan, M. Hajilou, C. Fernandez-Pello, M.J. Gollner</i> University of California - Berkeley	2B01: A cost function for optimizing manifold topology in reduced-order modeling <i>E. Armstrong¹, K. Zdybal², A. Parente², J.C. Sutherland¹</i> ¹ <i>University of Utah</i> ² <i>Université Libre de Bruxelles</i>	2C01: Ultra high efficiency combustion in a spark ignited heavy duty natural gas engine <i>J. Felipe Rodriguez¹, D. Bestel¹, H. Xu², G. Hampson³, B. Windom¹, A. Marchese¹, D.B. Olsen¹</i> ¹ <i>Colorado State University</i> ² <i>Cummins Inc.</i> ³ <i>Woodward Inc.</i>
9:35 – 9:55	2A02: Energy deposition by firebrands generated from tree-scale burns <i>S. Adusumilli, D. Blunck</i> Oregon State University	2B02: Flammability limit prediction of hydrogen-air flames using DSMC <i>S. Trivedi, J.K. Harvey, R.S. Cant</i> University of Cambridge	2C02: Experimental investigation on the effects of passive pre-chamber geometry and ignition system on the engine heat release rate profiles <i>F. Di Sabatino¹, P.J. Martinez-Hernandez², R. Novella Rosa², I. Ekoto¹</i> ¹ <i>Sandia National Laboratories Livermore</i> ² <i>Universitat Politècnica de València</i>
9:55 – 10:15	2A03: Experimental study on smoldering and flaming ignition of natural fuel by hot stainless steel, and brass particles <i>S. Saha, N. Maldonado, A.V. Juarez, Y. Guo, J. Cobian-Iñiguez</i> University of California, Merced	2B03 (Virtual): Performance of dynamically bi-orthonormal decomposition based reduced-order modeling in capturing strongly transient combustion phenomena <i>S. Desai¹, Y. Shimizu¹, M. Donello², H. Babaee², J.H. Chen¹</i> ¹ <i>Sandia National Laboratories</i> ² <i>University of Pittsburgh</i>	2C03: Simulation of a high-efficiency engine fueled by dilute anode tail-gas <i>M.A. Valles Castro, D. Olsen, T. Bandhauer, Z. Swartwout, B.C. Windom</i> Colorado State University

	Fire and Fire Safety III 420-041 Session Chair: D. Lignell	Numerical Methods and Machine Learning Techniques Applied to Combustion II 380X Session Chair: TBD	Internal Combustion Engines III 380Y Session Chair: B. Windom
10:15 – 10:35	2A04: Minimally invasive instrumentation for mock fire scenarios <i>B.C. Houchens¹, E. M.C. Jones², E.T. Zepper², A.W. Murphy², E.C. Quintana²</i> ¹ Sandia National Laboratories, Livermore ² Sandia National Laboratories, Albuquerque	2B04 (Virtual): Implementation of manifold-based combustion models in a highly scalable low Mach number reacting flow solver <i>B.A. Perry, M.T.H. de Frahan, S. Yellapantula, M.S. Day</i> National Renewable Energy Laboratory	2C04: Optimizing efficiency of an SI engine fueled by simulated exhaust anode tail-gas <i>Z. Swartwout, T. Bandhauer, B. Windom, S. Garland, R. Braun, D.B. Olsen</i> Colorado State University
10:35 – 10:55	2A05: Impacts of chemical composition and seasonal variability on ignition and burning of live fuels <i>H. Fazeli¹, E. Conrad², W.M. Jolly², D.L. Blunck¹</i> ¹ Oregon State University ² USDA Forest Service		
10:55 – 11:10	<p style="text-align: center;">BREAK</p> <p style="text-align: center;"><i>The 2022 Spring Hybrid Meeting of the Western States Section of The Combustion Institute</i></p> <p style="text-align: center;">is brought to you by:</p> <p style="text-align: center;">Ansys Exponent FM Global National Science Foundation</p>		
	Biomass Combustion and Gasification 420-041 Session Chair: TBD	Detonations, Explosions, and Supersonic Combustion II 380X Session Chair: B. Houchens	Internal Combustion Engines IV 380Y Session Chair: D. Bestel
11:10 – 11:30	2A06 (Virtual): An investigation into the depletion of oxygen in fuel bed fires <i>A.N. Howell¹, E.L. Belmont¹, S.S. McAllister², M.A. Finney²</i> ¹ The University of Wyoming ² US Forest Service	2B06: Isolating gasdynamic and chemical effects on detonation cellular structure and regularity <i>X. Shi¹, P.A. Meagher², J.P. Santos¹, N.K. Muraleedharan¹, J. Crane³, A.Y. Poludnenko², X. Zhao², H. Wang¹</i> ¹ Stanford University ² University of Connecticut ³ Queen's University	2C06: Autoignition and flame speed of premixed liquefied petroleum gas in a rapid compression machine: Experimental results and reduced chemical kinetic mechanism <i>C. Slunecka¹, A. Zdanowicz¹, S. Bhoite¹, I. Kessler¹, S. Vaughan¹, B. Windom¹, D. Olsen¹, A.J. Marchese²</i> ¹ Colorado State University ² University of Rhode Island
11:30 – 11:50	2A07 (Virtual): TLUD production of Bonechar for the removal of fluoride from drinking water <i>M.E. Baumgardner, N.R. Frojelin, R.B. Bahr, A. Graves, N. Stanton, K. Nolan, K. Shimabukuro</i> Gonzaga University	2B07 (Virtual): Ignition delay study of cracked JP10 <i>Saifullah, N. Agrawal, A. Bansal</i> Indian Institute of Technology Roorkee	2C07: Autoignition and spark ignition study of premixed liquefied petroleum gas in a rapid compression machine <i>S. Bhoite¹, C. Slunecka¹, B. Windom¹, D. Olsen¹, A.J. Marchese²</i> ¹ Colorado State University ² University of Rhode Island

	Biomass Combustion and Gasification 420-041 Session Chair: TBD	Detonations, Explosions, and Supersonic Combustion II 380X Session Chair: B. Houchens	Internal Combustion Engines IV 380Y Session Chair: D. Bestel
11:50 – 12:10	2A08 (Virtual): 154BIOQ-0021 Effect of additives in non-isothermal biomass pyrolysis <i>Y. Wongmat, D.R. Wagner</i> <i>San José State University</i>	2B08 (Virtual): Effect of ozone addition and LTC on DME detonation <i>M.C. Brown, E.L. Belmont</i> <i>The University of Wyoming</i>	2C08 (Virtual): Engine speed and fuel effects on knock for high compression ratio spark ignition engines <i>A.S. Bahar, B. Akih-Kumgeh</i> <i>Syracuse University</i>
12:10 – 12:30	2A09 (Virtual): 154BIOQ-0022 Devolatilization behavior of brewer's grain for energy production <i>S. Fogelquist, D.R. Wagner</i> <i>San José State University</i>		2C09 (Virtual): Engine CFD analysis of soot emissions from gasoline-alcohol blends under low-load gasoline compression ignition conditions <i>K.C. Kalvakala¹, P. Pal¹, G. Kukkadapu², M. McNenly², S. Wagnon², R. Whitesides², S.K. Aggarwal³</i> ¹ <i>Argonne National Laboratory</i> ² <i>Lawrence Livermore National Laboratory</i> ³ <i>University of Illinois at Chicago</i>
12:30 – 12:50	2A10 (Virtual): 154BIOQ-0003 Analysis of biochar combustion and combustion systems on powering a Stirling engine <i>K. Vickery, S. Qiu</i> <i>West Virginia University</i>		
12:50	Adjourn		
13:00	SLAC National Accelerator Laboratory Virtual Tour		

2022 WSSCI SPRING TECHNICAL MEETING AUTHOR LISTING

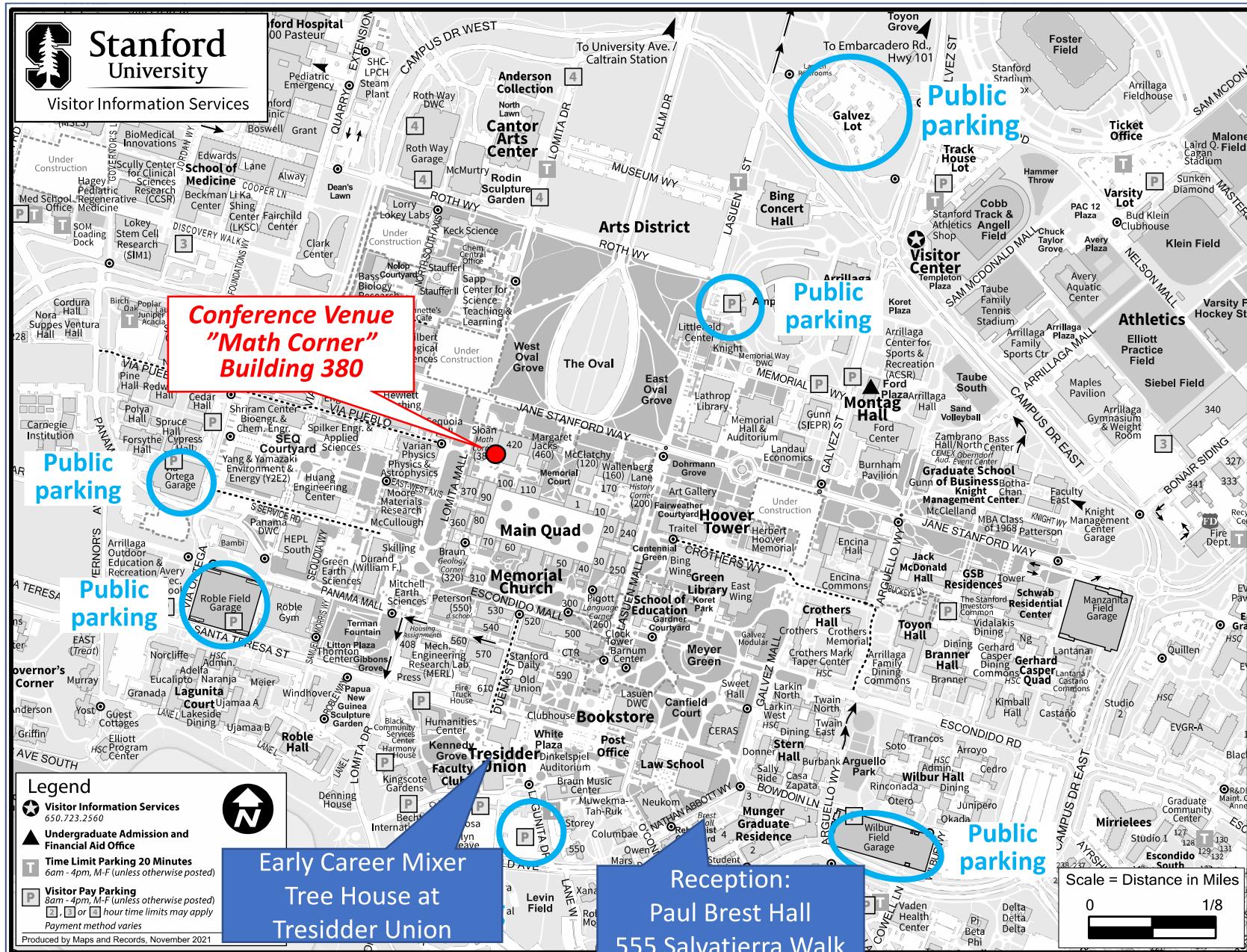
<i>Author</i>	<i>Paper #</i>	<i>Author</i>	<i>Paper #</i>	<i>Author</i>	<i>Paper #</i>	<i>Author</i>	<i>Paper #</i>
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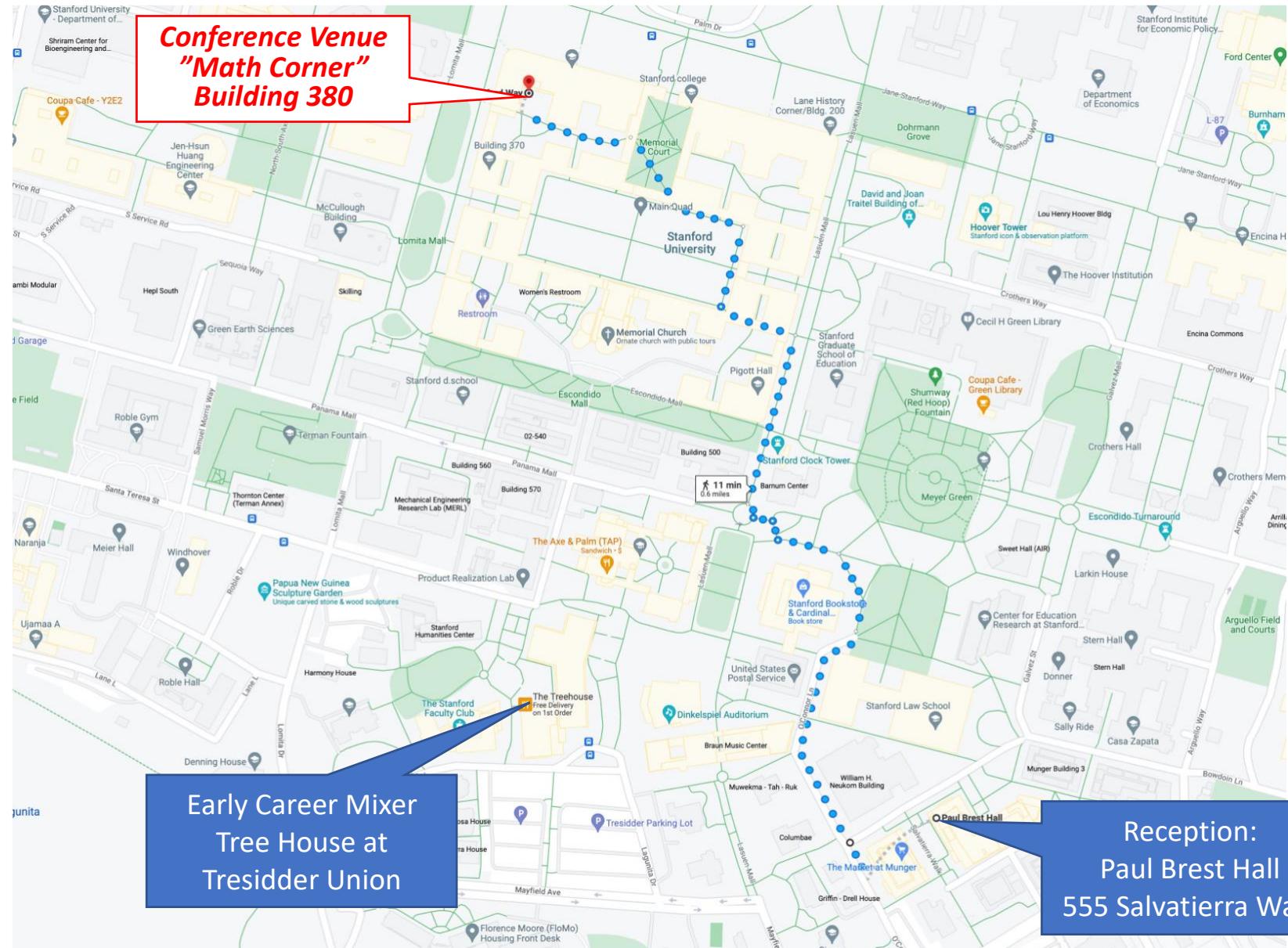
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