2020 SPRING TECHNICAL MEETING
WESTERN STATES SECTION OF THE COMBUSTION INSTITUTE
Stanford University – Stanford, CA

Monday, 23 March 2020

7:30 – 4:00   Registration
7:30 – 8:00   Continental Breakfast
8:00 – 8:15   Welcome Address
Welcome Remarks:

8:15 – 9:15   Plenary Lecturer: Michael Gollner, U.C. Berkeley The Dynamic Behavior of Fires: from Wildfires to Fire Whirls

9:15 – 9:25	Transition to Morning Sessions		
	Fires I	**Laminar Flames/Detonations**	**Chemical Kinetics I**
9:25 – 9:45	**1A01: Burning rate of porous fuel beds: Axisymmetric versus line fire** *S. McAllister* *USDA Forest Service*	**1B01: Statistics of cellularly unstable expanding laminar flame** *Z. Liu[1], V.R. Unni[2], S. Chaudhuri[3], C.K. Law[1], A. Saha[2]* *[1]Princeton University* *[2]University of California San Diego* *[3]University of Toronto*	**1C01: Computational design of sensitized combustion chemistry experiments** *C. Ising, P. Rodriguez, D. Lopez, J. Santner* *California State University*
9:45 – 10:05	**1A02: The effect of species and moisture content on flaming emissions from various vegetative fuels** *P. Garg[1], T. Roche[2], J. Matz[3], M. Eden[3], J. Oakes[3], C. Bellini[3], M.J. Gollner[1]* *[1]University of California Berkeley* *[2]University of Maryland* *[3]Northeastern University*	**1B02: Extinction of premixed flames with oscillating strain rates** *A. Potnis[1], V.R. Unni[1], C.K. Law[2], A. Saha[1]* *[1]University of California San Diego* *[2]Princeton University*	**1C02: Embedded error Bayesian calibration of thermal decomposition of organic composites** *A.L. Frankel1, R.M. Keedy, B.C. Houchens, E.B. Wagman, S.N. Scott* *Sandia National Laboratories*
10:05 – 10:25	**1A03: Influence of particle size on self-sustained smoldering** *A.H. Ross, D.L. Blunck* *Oregon State University*	**1B03: Diluent and spark-delay effects on flame stability in shock-tube flame speed experiments** *A.J. Susa, A.M. Ferris, R.K. Hanson* *Stanford University*	**1C03: When models fail: Resolving the low temperature oxidation kinetics of tetrahydrofuran** *K.S. Lockwood, N.J. Labbe* *University of Colorado Boulder*

	Fires I	Laminar Flames/Detonations	Chemical Kinetics I
10:25 – 10:45	**1A04: Wind effects on smoldering behavior of simulated wildland fuels** *J. Cobian-Iñiguez[1], H. Xiong[1,2], C. Fernandez-Pello[1], M. Gollner[1], S. Stephens[1], M. Finney[3]* *[1]University of California Berkeley* *[2]University of Science and Technology of China* *[3]USDA Forest Service*	**1B04: Detonation limit behaviors of methane and natural gas** *X. Shi, J. Crane, H. Wang* *Stanford University*	**1C04: First and second O_2 addition in low-temperature cyclopentane oxidation** *A.L. Dewyer, J. Zádor, L. Sheps* *Sandia National Laboratories*
10:45 – 11:05	**1A05: Effect of fuel bed properties on ignition by firebrands** *D. Bean, D.L. Blunck* *Oregon State University*	**1B05: Geometric modeling of detonation cellular propagation** *J. Crane, X. Shi, H. Wang* *Stanford University*	**1C05: Competitive oxidation of methane/ethylene fuel mixtures discerned by multi-isotopologue laser absorption spectroscopy** *D.I. Pineda, F.A. Bendana, R.M. Spearrin* *University of California Los Angeles*
11:05 – 11:20	**BREAK**		
	Fires II	Laminar Flames	Biomass/Gasification
11:20 – 11:40	**1A06: Sensitivity and uncertainty analysis on the dual-thermocouple technique for turbulent flame temperature measurements** *X. Ren[1,2], D. Zeng[3], Y. Wang[3], G. Xiong[3], G. Agarwal[3], M.J. Gollner[1,2]* *[1]University of Maryland* *[2]University of California Berkeley* *[3]FM Global*	**1B06: Effect of hydrogen enrichment on hydrocarbon edge flames** *A. Felden, L. Esclapez, M. Day* *Lawrence Berkeley National Laboratory*	**1C06: X-ray absorption tomography measurements of solid fuel combustion in wildfire conditions** *E. Boigné, M. Ihme* *Stanford University*
11:40 – 12:00	**1A07: Comparison of experimental results with theoretical predictions of inclined laminar flame characteristics** *R.S.P. Hakes[1,2], W. Coenen[3], A.L. Sánchez[2], M.J. Gollner[4], F.A. Williams[2]* *[1]University of Maryland* *[2]University of California San Diego* *[4]University of California Berkeley* *[3]Universidad Carlos III de Madrid*	**1B07: On numerical computations of structures of nonpremixed flames** *D. Shanmugasundaram[1], K. Narayanaswamy[1], L. Badiali[2], R. Khare[3], K. Seshadri[2]* *[1]Indian Institute of Technology Madras* *[2]University of California San Diego* *[3]Karlsruhe Institute of Technology*	**1C07: Ash effects on biomass char gasification rates** *R. Wu, J. Beutler, L. Baxter* *Brigham Young University*

	Fires II	Laminar Flames	Biomass/Gasification
12:00 – 12:20	**1A08: Effect of reduced ambient oxygen concentration and flow velocity on flame spread over simulated electrical wires** *L. Gagnon[1], C. Fernandez-Pello[1], V.P. Carey[1], Y. Konno[2], O. Fujita[2]* *[1]University of California Berkeley* *[2]Hokkaido University*	**1B08: Water-vapor addition into a methane diffusion flame** *B. Esquivias, Y.-C. Chien, M. Vicariotto, D. Dunn-Rankin* *University of California Irvine*	**1C08: Bayesian decision theory for operational optimization of a biomass boiler** *J.C. Parra-Alvarez[1], O. Diaz-Ibarra[1], S. Smith[1], L. Marshall[2], S. Harding[1], J. Thornock[1], J. Spinti[1], P. Smith[1]* *[1]University of Utah* *[2]Ontario Power Generation*
12:20 – 12:40	**1A09: Efficient simulations of propagating fires using adaptive mesh refinement** *C. Lapointe, N.T. Wimer, J.F. Glusman, A.S. Makowiecki, P. Sardana, J.W. Daily, G.B. Rieker, P.E. Hamlington* *University of Colorado Boulder*	**1B09: Laminar flame dynamics of multi-port fuel jets under acoustic forcing** *A. Vargas, J. Guerrero, A.R. Karagozian* *University of California Los Angeles*	**1C09: Developing a high fidelity simulation of a biomass boiler** *O. Diaz[1], J.C. Parra-Alvarez[1], S. Harding[1], L. Marshall[2], S. Smith[1,3], J. Thornock[1,3], M. Hradisky[1], J. Spinti[1,3], P. Smith[1,3]* *[1]Institute for Clean and Secure Energy* *[2]Ontario Power Generation* *[3]University of Utah*
12:40 – 13:40	LUNCH –		
	Fires III	Turbulent Flames I	Chemical Kinetics II
13:40 – 14:00	**1A10: Upward flame spread over thin fabrics in normoxic atmospheres** *M. Thomsen[1], C. Fernandez-Pello[1], D.L. Urban[2], G.A. Ruff[2]* *[1]University of California Berkeley* *[2]NASA Glenn Research Center*	**1B10: Data-driven assignment of combustion submodels for large-eddy simulation** *W.T. Chung[1], A.A. Mishra[1], N. Perakis[1,2], M. Ihme[1]* *[1]Stanford University* *[2]Technical University of Munich*	**1C10: Impact of pyrolysis species measurement uncertainties on the prediction accuracy of HyChem reaction model – A case study on Jet A** *R. Xu, H. Wang* *Stanford University*
14:00 - 14:20	**1A11: The use of fire resistant fabric to quantify firebrand production from trees** *S. Adusumilli, T. Hudson, N. Gardner, D. Blunck* *Oregon State University*	**1B11: Reduced-order thermochemical state manifolds with co-optimized linear embeddings and nonlinear mappings** *B.A. Perry, M.T. Henry de Frahan, S. Yellapantula, R.W. Grout* *National Renewable Energy Laboratory*	**1C11: Heat release from oxidation of aliphatic hydrocarbon groups and their effects on the piecewise characteristics and spontaneous combustion tendency of coal** *T. Xu, J. Qi, X. Li, Y. Wu* *Shanghai Maritime University*
14:20 - 14:40	**1A12: Downward flame spread rate over PMMA cylinders under external radiant heating** *A. Rodriguez[1], M. Thomsen[1], C. Fernandez-Pello[1], M. Gollner[1], S. Olson[2], P. Ferkul[2]* *[1]University of California Berkeley* *[2]NASA Glenn Research Center*	**1B12: A framework for experiment-based turbulent combustion modeling** *R. Ranade, T. Echekki* *North Carolina State University*	**1C12: Thermodynamic properties of key intermediates in the combustion of methyl methacrylate** *G. Blanquart, J. Rabinovitch* *California Institute of Technology*

	Fires III	Turbulent Flames I	Chemical Kinetics II
14:40 - 15:00	**1A13: An experimental study on flame spread over vertical corrugated cardboard: Influence of grain orientation** *H. Xiong[1,2], L. Hu[1]* *[1]University of Science and Technology of China* *[2]University of California Berkeley*	**1B13: Diluent gas effects on turbulent consumption speed of Jet-A** *J.M. Bonebrake, D.L. Blunck* *Oregon State University*	**1C13: On the possible coexistence of two different regimes of metal particle combustion** *I. Altman[1], A. Demko[1], K. Hill[1], M. Pantoya[2]* *[1]Naval Air Warfare Center* *[2]Texas Tech University*
15:00 - 15:20	**1A14: Assessing fire toxicant formation in solid fuel combustion using laser absorption tomography** *D.I. Pineda[1], J.L. Urban[2], R.M. Spearrin[1]* *[1]University of California Los Angeles* *[2]Worcester Polytechnic University*	**1B14: Error/cost-controlled Pareto-efficient combustion modeling as a multiple-choice knapsack problem** *Q. Douasbin, M. Ihme* *Stanford University*	**1C14: Kinetic modeling of NO emission for synthetic natural gas at high pressure: Transport parameter-dependent speciation analysis** *F. Alam* *Exponent Inc.*
15:20 - 15:35	BREAK -		
	Fires/Soot	Turbulent Flames II	Chemical Kinetics III
15:35 - 15:55	**1A15: Fire whirls in microgravity** *M.R. Jones[1], S.B. Hariharan[1,2], M.J. Gollner[2], V.M. Valletta[3], L. Ogorzaly[3], E. Neumann[3], P. Ferkul[3], S. Olson[3], E.S. Oran[4]* *[1]University of Maryland* *[2]University of California Berkeley* *[3]NASA Glenn Research Center* *[4]Texas A&M University*	**1B15: Evolution of local statistics for premixed turbulent Bunsen flames** *Y. Weng[1], A. Potnis[1], V.R. Unni[1], S. Chaudhuri[2], A. Saha[1]* *[1]University of California San Diego* *[2]University of Toronto*	**1C15: Systematic reduction and validation of a 96 species n-decane mechanism under engine-relevant conditions** *G. Xiao* *Wuhan University of Science and Technology*
15:55 - 16:15	**1A16: Effect of enclosure dimensions on formation of laboratory-scale fire whirls** *J. Dowling[1], S.B. Hariharan[1,5], E.S. Oran[2], T. Xu[1,3], A. Stoppel[1,4], M.J. Gollner[5]* *[1]University of Maryland* *[2]Texas A&M University* *[3]Shanghai Maritime University* *[4]University of Applied Sciences, Düsseldorf* *[5]University of California Berkeley*	**1B16: Compressibility effects in subsonic turbulent premixed flames** *G. Beardsell, G. Blanquart* *California Institute of Technology*	**1C16: Development of error-controlled compact mechanisms using reduction and optimization** *G. Litrico, K. Puduppakkam, C. Naik, E. Meeks* *ANSYS Inc.*

	Fires/Soot	Turbulent Flames II	Chemical Kinetics III
16:15 - 16:35	**1A17: HOMO-LUMO gaps of transition-metal-doped polycyclic aromatic hydrocarbons** *N. Kateris, R. Xu, H. Wang* *Stanford University*	**1B17: Turbulent combustion behaviour of premixed ammonia/hydrogen/nitrogen-air flames at different equivalence ratios** *M. Rieth[1], A. Gruber[2], J.H. Chen[1]* *[1]Sandia National Laboratories* *[2]SINTEF Energy Research*	**1C17: Reaction-diffusion manifolds (REDIMs) reduced chemistry for the CH4 counter-flow diffusion flames under oxygen-enriched MILD condition** *C. Wu[1], C. Yu[1], U. Maas[1], Y. Sun[2]* *[1]Karlsruhe Institute of Technology* *[2]Beijing Institute of Technology*
16:35 - 16:55	**1A18: Role of cyclopenta-ring and H atom in polycyclic aromatic hydrocarbon dimerization at high temperatures** *R. Xu, C. Liu, H. Wang* *Stanford University*	**1B18: Round jet diffusion flames under transverse acoustic forcing** *M.A. Plascencia[1], M. Roa[2], A.R. Karagozian[1], D.G. Talley[2]* *[1]University of California Los Angeles* *[2]Air Force Research Laboratory*	**1C18: A neural-network-based response surface method for reaction model optimization and uncertainty minimization** *Y. Zhang[1], R. Xu[1], G. Smith[2], H. Wang[1]* *[1]Stanford University* *[2]SRI International*
16:55 - 17:15	**1A19: A ring-additivity method for benzenoid PAH property estimation** *C.J. Pope* *Cabrillo College*	**1B19: Combustion studies of MMA/GOx for a hybrid rocket motor** *C. Dhandapani, G. Blanquart, J. Rabinovitch* *California Institute of Technology*	**1C19: A hybrid ODE integration approach for chemical kinetics based on stiffness** *P.E. Lorson, K.E. Niemeyer* *Oregon State University*
17:15 - 17:35	**1A20: Pyrolysis of sagebrush** *M. Kier, D. Blunck, C. Hagen* *Oregon State University*		
18:00	**Reception –**		

WSS/CI Western States Section/Combustion Institute

Tuesday, 24 March 2020

7:30 – 12:00 Registration:
7:30 – 8:00 Breakfast:
8:00 – 8:05 Opening Remarks and Announcement:
8:05 – 9:05 Plenary Lecture: Nicole Labbe, *University of Colorado at Boulder*

9:05 – 9:15	Transition to Morning Sessions		
	Nanomaterials/Soot	**Environmental/Reactions/Sprays**	**Engines**
9:15 – 9:35	**2A01: Implementation of a SpraySyn system for standardized spray flame synthesis studies** *H.R. Fernández, S. Dasappa, J. Camacho* *San Diego State University*	**2B01: A dispersion model for multi-component reacting flows** *O.B. Shende, A. Mani* *Stanford University*	**2C01: Group 2 UAS engine performance testing using SAE AS6971 draft standard** *S. Scott, J. Benbrook, C. Hagen* *Oregon State University*
9:35 – 9:55	**2A02: Computational fluid dynamics modeling of flame spray pyrolysis for nanoparticle synthesis** *D. Dasgupta, P. Pal, R. Torelli, S. Som* *Argonne National Laboratory*	**2B02: Gas appliances operating on hydrogen/natural gas mixtures and comparison with electrical counterparts** *Y. Zhao, V. McDonell, S. Samuelsen* *University of California Irvine*	**2C02: In-cylinder optical diagnostics of pre-chamber spark ignition systems for high-efficiency natural gas engines** *R. Rajasegar[1], Y. Niki[1,2], J.M.G. Oliver[1,3], Z. Li[1], D. Carpenter[1,4], M.P.B. Musuclus[1]* *[1]Sandia National Laboratories* *[2]National Maritime Research Institute* *[3]Universitat Politècnica de València* *[4]University of South Carolina*
9:55 – 10:15	**2A03: Synthesis of manganese oxide nanoparticles in premixed stagnation flames** *S. Dasappa[1,2], J. Camacho[1]* *[1]San Diego State University* *[2]University of California San Diego*	**2B03: Effect of SO_2 on Cu-Mn oxide's reactivity with CH_4 in chemical looping combustion** *T. Barua, B. Padak* *University of California Irvine*	**2C03: Pre-ignition detection and damage mitigation in a spark-ignited engine** *E. Singh, R. Dibble* *King Abdullah University of Science and Technology*
10:15 – 10:35	**2A04: Carbon nanoparticle production through hydrocarbon pyrolysis experimentation and modeling** *N. Bauer, F. Miller* *San Diego State University*	**2B04: Non-premixed reactive volatilization reactor for catalytic partial oxidation of ethanol** *Y. Lin, W.F. Northrop* *University of Minnesota*	**2C04: Direct numerical simulation of multi-injection at low-temperature compression ignition engine conditions** *M. Rieth[1], M. Day[2], E. Motheau[2], C.-B. Kweon[3], J. Temme[3], T. Lu[4], L. Pickett[1], J.H. Chen[1]* *[1]Sandia National Laboratories* *[2]Lawrence Berkeley National Laboratory* *[3]CCDC Army Research Laboratory* *[4]University of Connecticut*

	Nanomaterials/Soot	Environmental/Reactions/Sprays	Engines
10:35 – 10:55	**2A05: Size-resolved modeling of optical absorption of small soot particles** *K. Wan, X. Shi, H. Wang* *Stanford University*	**2B05: Analysis of spray and gaseous fields in the Cambridge burner near lean blow-out** *D. Mohaddes, M. Ihme* *Stanford University*	**2C05: Influences of parametric variations on Spray A flames using high-Speed formaldehyde planar LIF and schlieren** *H.S. Sim[1], N. Maes[1], L.M. Pickett[1], S.A. Skeen[2]* *[1]Sandia National Laboratories* *[2]Dixie State University*
10:55 – 11:10	BREAK		
	Microcombustion/New Concepts	Diagnostics	Engines/Numerics
11:10 – 11:30	**2A06: Analyzing OH*, CH*, and C2* chemiluminescence of bifurcating FREI propane-air flames in a micro flow reactor** *M.E. Baumgardner, J. Harvey* *Gonzaga University*	**2B06: Synchrotron-based measurement of aluminum interaction with melt layer of solid propellants at motoring conditions** *A.R. Demko[1], K. Hill[1], E. Ismael[1], A. Kastengren[2]* *[1]Naval Air Warfare Center* *[2]Argonne National Laboratory*	**2C06: Numerical investigation of a dual-stage off-gas burner to support an SOFC/GT hybrid power system operating at elevated temperature and pressure conditions** *D. Jaimes, V. McDonell, S. Samuelsen* *University of California Irvine*
11:30 – 11:50	**2A07: Design and optimization of micro-combustor for portable charging applications** *D. Dasgupta[1], V. Stelmakh[2], D. Longman[1], S. Som[1]* *[1]Argonne National Laboratory* *[2]Mesodyne, Inc.*	**2B07: Analysis of noisy radiometer data from ISS reduced gravity droplet combustion experiments** *S. Das, B.D. Shaw* *University of California Davis*	**2C07: Reactor network analysis of a piloted model gas turbine combustor with hydrogen mixed natural gas** *C. Hernandez, V. McDonell* *University of California Irvine*
11:50 – 12:10	**2A08: Ignition mechanism of low-temperature transient plasma** *S. Biswas[1], I. Ekoto[1], R. Scarcelli[2]* *[1]Sandia National Laboratories* *[2]Argonne National Laboratory*	**2B08: Mid-IR laser absorption diagnostic for shock tube measurements of temperature in high-concentration experiments** *S. Clees, V. Boddapati, R. Choudhary, R.K. Hanson* *Stanford University*	**2C08: Modeling transition to thermoacoustic instability in laminar combustors in a framework of synchronization** *Y. Weng[1], V.R. Unni[1], R.I. Sujith[2], A. Saha[1]* *[1]University of California San Diego* *[2]Indian Institute of Technology Madras*

	Microcombustion/New Concepts	Diagnostics	Engines/Numerics
12:10 – 12:30	**2A09: Predicting bio-jet properties using a tree-based pipeline optimization tool** *A.E. Comesana[1], T. Huntington[1], M. Mayer[2], K. Niemeyer[2], V.H. Rapp[1]* *[1]Lawrence Berkeley National Laboratory* *[2]Oregon State University*	**2B09: A time-resolved gas chromatography sampling diagnostic for species measurements in extended test-time shock tube experiments** *A.M. Ferris, D.F. Davidson, R.K. Hanson* *Stanford University*	**2C09: Data-driven selection of stiff chemistry ODE solver in operator-splitting schemes** *S. Lapointe, S. Mondal, R.A. Whitesides* *Lawrence Livermore National Laboratory*
12:30 – 12:50	**2A10: Infrared measurements of forward heat conduction during simulated microgravity flame spread in the narrow channel apparatus** *M. Berry[1], F. Miller[1], S. Olson[2], I. Wichman[3]* *[1]San Diego State University* *[2]NASA Glenn Research Center* *[3]Michigan State University*		**2C10: Challenges in predicting fuel properties with machine learning** *M.A. Mayer[1], A. Comesana[2], T. Huntington[2], V.H. Rapp[2], K.E. Niemeyer[1]* *[1]Oregon State University* *[2]Lawrence Berkeley National Laboratory*
12:50	**Adjourn**		
1:15	**SLAC Tour**		