

Stanford



Matthias Ihme

Professor of Mechanical Engineering, of Photon Science and, by courtesy, of Energy Science and Engineering

CONTACT INFORMATION

- **Administrative Contact**

Ria Tan - Administrator

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Bio

BIO

Large-eddy simulation and modeling of turbulent reacting flows, non-premixed flame, aeroacoustics and combustion generated noise, turbulence and fluid dynamics, numerical methods and high-order schemes.

ACADEMIC APPOINTMENTS

- Professor, Mechanical Engineering
- Professor, Photon Science Directorate
- Professor (By courtesy), Energy Science & Engineering
- Principal Investigator, Stanford PULSE Institute

PROFESSIONAL EDUCATION

- Ph.D, Stanford University , Mechanical Engineering (2008)
- M.Sc., University of Erlangen, Germany , Computational Engineering (2002)
- Dipl.-Ing., Munich University of Applied Sciences, Germany , Mechanical Engineering (2000)

Teaching

COURSES

2024-25

- Engineering Thermodynamics: ME 30 (Aut)
- Turbulent Combustion: ME 471 (Win)

2023-24

- Advanced Fluid Mechanics Multiphase Flows: ME 451A (Aut)
- Engineering Thermodynamics: ME 30 (Win)
- Gas-Turbine Design Analysis: ME 257, ME 357 (Spr)

- Wildfire Science: ME 375 (Spr)

2022-23

- Discontinuous Galerkin Methods for Fluid-Flow Simulations: ME 336 (Win)
- Engineering Thermodynamics: ME 30 (Aut)
- Wildfire Science: ME 375 (Spr)

2021-22

- Advanced Fluid Mechanics Multiphase Flows: ME 451A (Win)
- Gas-Turbine Design Analysis: ME 257 (Spr)

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Jingcun Fan, Jen Zen Ho, Haoyuan Li, Karl Toepferwien, Guillaume Vignat, Taekeun Yoon, Xuren Zhu

Doctoral Dissertation Advisor (AC)

Bassem Akoush, Matthew Bonanni, James Hansen, Benyamin Krisna, Nguyen Ly, Arijit Majumdar, Priyanka Muhunthan, David Wu

Master's Program Advisor

Ziang Cao, Yixiang Guo, Chris Li, Varun Pathak, Aryan Sood, Charles Tilney-Volk, Hao Zhang

Postdoctoral Research Mentor

Davy Brouzet

Doctoral (Program)

Shivansh Chaturvedi, Jin Lee, Yuxuan Li, Wada Sho, Christopher Williams, Beverley Yeo, Khaled Younes

Publications

PUBLICATIONS

- **A regularized-interface method as a unified formulation for simulations of high-pressure multiphase flows** *JOURNAL OF COMPUTATIONAL PHYSICS*
Ly, N., Ihme, M.
2024; 518
- **A high-order diffused-interface approach for two-phase compressible flow simulations using a discontinuous Galerkin framework** *JOURNAL OF COMPUTATIONAL PHYSICS*
Tonicello, N., Ihme, M.
2024; 508
- **Small-scale turbulent characteristics in transcritical wall-bounded flows** *JOURNAL OF FLUID MECHANICS*
Li, F., Zhang, W., Bai, B., Ihme, M.
2024; 986
- **Analysis of weak secondary waves in a rotating detonation engine using large-eddy simulation and wavenumber-domain filtering** *COMBUSTION AND FLAME*
Vignat, G., Brouzet, D., Bonanni, M., Ihme, M.
2024; 263
- **Mixtures Recomposition by Neural Nets: A Multidisciplinary Overview.** *Journal of chemical information and modeling*
Nicolle, A., Deng, S., Ihme, M., Kuzhagaliyeva, N., Ibrahim, E. A., Farooq, A.
2024
- **A versatile pressure-cell design for studying ultrafast molecular-dynamics in supercritical fluids using coherent multi-pulse x-ray scattering.** *The Review of scientific instruments*

- Muhunthan, P., Li, H., Vignat, G., Toro, E. R., Younes, K., Sun, Y., Sokaras, D., Weiss, T., Rajkovic, I., Osaka, T., Inoue, I., Song, S., Sato, et al
2024; 95 (1)
- **Experiment and modeling of stochastic ignition and combustion of fuel droplets impacting a hot surface** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Ly, N., Ma, Y., Vignat, G., Hashimoto, N., Ihme, M.
2024; 40 (1-4)
 - **Ensemble predictions of laser ignition with a hybrid stochastic physics-embedded deep-learning framework** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Chung, W., Laurent, C., Passiatore, D., Ihme, M.
2024; 40 (1-4)
 - **Artificial intelligence as a catalyst for combustion science and engineering** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Ihme, M., Chung, W.
2024; 40 (1-4)
 - **Analysis of residence time distribution in a cavity-stabilized scramjet combustor** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Bonanni, M., Norris, A., Ihme, M.
2024; 40 (1-4)
 - **Experimental demonstration of a two-stage porous media burner for low-emission ammonia combustion** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Vignat, G., Zirwes, T., Boigne, E., Ihme, M.
2024; 40 (1-4)
 - **Augmenting filtered flame front displacement models for LES using machine learning with a <i>posteriori</i> simulations** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Ho, J., Talei, M., Brouzet, D., Chung, W., Sharma, P., Ihme, M.
2024; 40 (1-4)
 - **Coupling of detonation structure and upstream inhomogeneities in a rotating detonation engine** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Bonanni, M., Brouzet, D., Vignat, G., Ihme, M.
2024; 40 (1-4)
 - **Examining diesel-spray assisted ignition of ammonia under reactivity-controlled conditions using large-eddy simulations** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Sharma, P., Brouzet, D., Chung, W., Ihme, M.
2024; 40 (1-4)
 - **Predictions of instantaneous temperature fields in jet-in-hot-coflow flames using a multi-scale U-Net model** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Kildare, J. C., Chung, W., Evans, M. J., Tian, Z. F., Medwell, P. R., Ihme, M.
2024; 40 (1-4)
 - **Integrated experimental and computational analysis of porous media combustion by combining gas-phase synchrotron μ CT, IR-imaging, and pore-resolved simulations** *COMBUSTION AND FLAME*
Boigne, E., Zirwes, T., Parkinson, D. Y., Vignat, G., Muhunthan, P., Barnard, H. S., MacDowell, A. A., Ihme, M.
2024; 259
 - **Analysis of direct and indirect noise in a next-generation aviation gas turbine combustor** *COMBUSTION AND FLAME*
Brouzet, D., Krisna, B., McCormick, D., Reimann, C., Mendoza, J., Ihme, M.
2024; 260
 - **Autonomous screening of complex phase spaces using Bayesian optimization for SAXS measurements** *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT*
Younes, K., Poli, M., Muhunthan, P., Rajkovic, I., Ermon, S., Weiss, T. M., Ihme, M.
2023; 1057
 - **Evaluation of Electron Tomography Capabilities for Shale Imaging.** *Microscopy and microanalysis : the official journal of Microscopy Society of America, Microbeam Analysis Society, Microscopical Society of Canada*

- Frouté, L., Boigné, E., Jolivet, I. C., Chaput, E., Creux, P., Ihme, M., Kovscek, A. R.
2023
- **Improving volume-averaged simulations of matrix-stabilized combustion through direct X-ray μ CT characterization: Application to NH_3 -air combustion** *COMBUSTION AND FLAME*
Zirwes, T., Vignat, G., Toro, E. R., Boigne, E., Younes, K., Trimis, D., Ihme, M.
2023; 257
 - **Accelerating Large-Eddy Simulations of Clouds With Tensor Processing Units** *JOURNAL OF ADVANCES IN MODELING EARTH SYSTEMS*
Chammas, S., Wang, Q., Schneider, T., Ihme, M., Chen, Y., Anderson, J.
2023; 15 (10)
 - **Assessing requirements for modeling radiation in diffusion flames using an analytical, non-local model** *COMBUSTION AND FLAME*
Fraga, G. C., Wu, B., Ihme, M., Zhao, X.
2023; 255
 - **Local Rearrangement in Adsorption Layers of Nanoconfined Ethane** *JOURNAL OF PHYSICAL CHEMISTRY C*
Simeski, F., Wu, J., Hu, S., Tsotsis, T. T., Jessen, K., Ihme, M.
2023
 - **Recurrent Convolutional Deep Neural Networks for Modeling Time-Resolved Wildfire Spread Behavior** *FIRE TECHNOLOGY*
Burge, J., Bonanni, M. R., Hu, R., Ihme, M.
2023
 - **LES of HCCI combustion of iso-octane/air in a flat-piston rapid compression machine** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Chung, W., Ly, N., Ihme, M.
2023; 39 (4): 5309-5317
 - **Combustion of lean ammonia-hydrogen fuel blends in a porous media burner** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Vignat, G., Akoush, B., Toro, E. R., Boigne, E., Ihme, M.
2023; 39 (4): 4195-4204
 - **Interaction of preferential evaporation and low-temperature chemistry in multicomponent counterflow spray flames** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Bonanni, M., Ihme, M.
2023; 39 (2): 2565-2573
 - **Wall heat transfer and flame structure transitions in stagnating spray flames** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Mohaddes, D., Ihme, M.
2023; 39 (2): 2683-2692
 - **Jet-entrainment sampling: A new method for extracting particles from flames** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Michelsen, H. A., Boigne, E., Schrader, P. E., Johansson, K., Campbell, M. F., Bambha, R. P., Ihme, M.
2023; 39 (1): 847-855
 - **The Local Electronic Structure of Supercritical CO_2 from X-ray Raman Spectroscopy and Atomistic-Scale Modeling.** *The journal of physical chemistry letters*
Muhunthan, P., Paredes Mellone, O., Kroll, T., Sokaras, D., Ihme, M.
2023: 4955-4961
 - **Analysis of ducted fuel injection at high-pressure transcritical conditions using large-eddy simulations** *INTERNATIONAL JOURNAL OF ENGINE RESEARCH*
Guo, J., Brouzet, D., Chung, W., Ihme, M.
2023
 - **Supercritical fluids behave as complex networks.** *Nature communications*
Simeski, F., Ihme, M.
2023; 14 (1): 1996
 - **Reaction nanoscopy of ion emission from sub-wavelength propanediol droplets** *NANOPHOTONICS*
Rosenberger, P., Dagar, R., Zhang, W., Majumdar, A., Neuhaus, M., Ihme, M., Bergues, B., Kling, M. F.

2023

- **A Review of Physics-Informed Machine Learning in Fluid Mechanics** *ENERGIES*
Sharma, P., Chung, W., Akoush, B., Ihme, M.
2023; 16 (5)
- **Experimental and numerical investigation of flame stabilization and pollutant formation in matrix stabilized ammonia-hydrogen combustion** *COMBUSTION AND FLAME*
Vignat, G., Zirwes, T., Toro, E. R., Younes, K., Boigne, E., Muhunthan, P., Simitz, L., Trimis, D., Ihme, M.
2023; 250
- **Cost-constrained adaptive simulations of transient spray combustion in a gas turbine combustor** *COMBUSTION AND FLAME*
Mohaddes, D., Brouzet, D., Ihme, M.
2023; 249
- **Regimes of evaporation and mixing behaviors of nanodroplets at transcritical conditions** *FUEL*
Ly, N., Majumdar, A., Ihme, M.
2023; 331
- **A high-resolution large-eddy simulation framework for wildland fire predictions using TensorFlow** *INTERNATIONAL JOURNAL OF WILDLAND FIRE*
Wang, Q., Ihme, M., Linn, R. R., Chen, Y., Yang, V., Sha, F., Clements, C., Mcdanold, J. S., Anderson, J.
2023; 32 (12): 1711-1725
- **Turbulence in Focus: Benchmarking Scaling Behavior of 3D Volumetric Super-Resolution with BLASTNet 2.0 Data**
Chung, W., Akoush, B., Sharma, P., Tamkin, A., Jung, K., Chen, J. H., Guo, J., Brouzet, D., Talei, M., Savard, B., Poludnenko, A. Y., Ihme, M., Oh, et al
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023
- **Dynamics and structure of detonations in stratified product-gas diluted mixtures** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Brouzet, D., Vignat, G., Ihme, M.
2023; 39 (3): 2855-2864
- **Analysis of real-fluid thermodynamic effects on turbulent statistics in transcritical channel flows** *Physical Review Fluids*
Li, F., Guo, J., Bai, B., Ihme, M.
2023; 8 (2): 024605
- **Corrosive Influence of Carbon Dioxide on Crack Initiation in Quartz: Comparison With Liquid Water and Vacuum Environments** *Journal of Geophysical Research: Solid Earth*
Simeski, F., Ihme, M.
2023; 128 (1)
- **The dynamics of non-premixed flames subjected to a transverse acoustic mode** *COMBUSTION AND FLAME*
Brouzet, D., You, S., Plascencia, M. A., Roa, M., Ihme, M.
2022; 246
- **BLASTNet: A call for community-involved big data in combustion machine learning** *APPLICATIONS IN ENERGY AND COMBUSTION SCIENCE*
Chung, W., Jung, K., Chen, J. H., Ihme, M.
2022; 12
- **Computing Thermodynamic Properties of Fluids Augmented by Nanoconfinement: Application to Pressurized Methane.** *The journal of physical chemistry. B*
Singh, N., Simeski, F., Ihme, M.
2022
- **Simulations of Dusty Flows over Full-Scale Capsule During Martian Entry** *JOURNAL OF SPACECRAFT AND ROCKETS*
Ching, E. J., Singh, N., Ihme, M.
2022
- **Turbulence-induced bias in time-averaged laser absorption tomography of correlated concentration and temperature fields with a first-order correction** *COMBUSTION AND FLAME*
Wei, C., Perakis, N., Pineda, D., Egolfopoulos, F. N., Ihme, M., Spearrin, R.
2022; 242

- **Destabilization of binary mixing layer in supercritical conditions** *JOURNAL OF FLUID MECHANICS*
Ly, N., Ihme, M.
2022; 945
- **Combustion machine learning: Principles, progress and prospects** *PROGRESS IN ENERGY AND COMBUSTION SCIENCE*
Ihme, M., Chung, W., Mishra, A.
2022; 91
- **On the hot surface ignition of a wall-stagnating spray flame** *COMBUSTION AND FLAME*
Mohaddes, D., Ihme, M.
2022; 240
- **Interpretable data-driven methods for subgrid-scale closure in LES for transcritical LOX/GCH₄ combustion** *COMBUSTION AND FLAME*
Chung, W., Mishra, A., Ihme, M.
2022; 239
- **A TensorFlow simulation framework for scientific computing of fluid flows on tensor processing units** *COMPUTER PHYSICS COMMUNICATIONS*
Wang, Q., Ihme, M., Chen, Y., Anderson, J.
2022; 274
- **Computation of hypersonic viscous flows with the thermally perfect gas model using a discontinuous Galerkin method** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN FLUIDS*
Ching, E. J., Bensassi, K., Lv, Y., Ihme, M.
2022
- **Chemical and Reactive Transport Processes Associated with Hydraulic Fracturing of Unconventional Oil/Gas Shales.** *Chemical reviews*
Jew, A. D., Druhan, J. L., Ihme, M., Kovscek, A. R., Battiato, I., Kaszuba, J. P., Bargar, J. R., Brown, G. E.
2022
- **General Drag Coefficient for Flow over Spherical Particles** *AIAA JOURNAL*
Singh, N., Kroells, M., Li, C., Ching, E., Ihme, M., Hogan, C. J., Schwartzentruber, T. E.
2022; 60 (2): 587-597
- **Structural analysis of biomass pyrolysis and oxidation using in-situ X-ray computed tomography** *COMBUSTION AND FLAME*
Boigne, E., Bennett, N., Wang, A., Ihme, M.
2022; 235
- **Towards Data-Informed Motion Artifact Reduction in Quantitative CT Using Piecewise Linear Interpolation** *IEEE TRANSACTIONS ON COMPUTATIONAL IMAGING*
Boigne, E., Parkinson, D. Y., Ihme, M.
2022; 8: 917-932
- **Quail: A lightweight open-source discontinuous Galerkin code in Python for teaching and prototyping** *SOFTWAREX*
Ching, E. J., Bornhoft, B., Lasemi, A., Ihme, M.
2022; 17
- **Structure of the thermal boundary layer in turbulent channel flows at transcritical conditions** *Journal of Fluid Mechanics*
Guo, J., Yang, X. I., Ihme, M.
2022; 934 (A45)
- **Quantitative X-ray computed tomography: Prospects for detailed in-situ imaging in bench-scale fire measurements** *FIRE SAFETY JOURNAL*
Boigne, E., Bennett, N., Wang, A., Ihme, M.
2021; 126
- **Imaging the short-lived hydroxyl-hydronium pair in ionized liquid water.** *Science (New York, N.Y.)*
Lin, M., Singh, N., Liang, S., Mo, M., Nunes, J. P., Ledbetter, K., Yang, J., Kozina, M., Weathersby, S., Shen, X., Cordones, A. A., Wolf, T. J., Pemmaraju, et al
2021; 374 (6563): 92-95
- **Heat transfer augmentation by recombination reactions in turbulent reacting boundary layers at elevated pressures** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*

-
- Perakis, N., Haidn, O. J., Ihme, M.
2021; 178
- **Infrasound Radiation From Impulsive Volcanic Eruptions: Nonlinear Aeroacoustic 2D Simulations** *JOURNAL OF GEOPHYSICAL RESEARCH-SOLID EARTH*
Watson, L. M., Dunham, E. M., Mohaddes, D., Labahn, J., Jaravel, T., Ihme, M.
2021; 126 (9)
 - **Development of a particle collision algorithm for discontinuous Galerkin simulations of compressible multiphase flows** *JOURNAL OF COMPUTATIONAL PHYSICS*
Ching, E. J., Ihme, M.
2021; 436
 - **Efficient projection kernels for discontinuous Galerkin simulations of disperse multiphase flows on arbitrary curved elements** *JOURNAL OF COMPUTATIONAL PHYSICS*
Ching, E. J., Ihme, M.
2021; 435
 - **Hot surface ignition of a wall-impinging fuel spray: Modeling and analysis using large-eddy simulation** *COMBUSTION AND FLAME*
Mohaddes, D., Boettcher, P., Ihme, M.
2021; 228: 443–56
 - **Analysis of droplet evaporation in isotropic turbulence through droplet-resolved DNS** *INTERNATIONAL JOURNAL OF HEAT AND MASS TRANSFER*
Dodd, M. S., Mohaddes, D., Ferrante, A., Ihme, M.
2021; 172
 - **Effects of evaporation on chemical reactions in counterflow spray flames** *PHYSICS OF FLUIDS*
Xie, W., Wu, W., Ren, Z., Liu, H., Ihme, M.
2021; 33 (6)
 - **A discontinuous Galerkin method for wall-modeled large-eddy simulations** *COMPUTERS & FLUIDS*
Lv, Y., Yang, X. A., Park, G., Ihme, M.
2021; 222
 - **Limitations of flamelet formulation for modeling turbulent pool fires** *COMBUSTION AND FLAME*
Wu, B., Ihme, M., Zhao, X.
2021; 227: 346–58
 - **Sensitivity of Hypersonic Dusty Flows to Physical Modeling of the Particle Phase** *JOURNAL OF SPACECRAFT AND ROCKETS*
Ching, E., Barnhardt, M., Ihme, M. I.
2021; 58 (3): 653-667
 - **Data-assisted combustion simulations with dynamic submodel assignment using random forests** *COMBUSTION AND FLAME*
Chung, W., Mishra, A., Perakis, N., Ihme, M.
2021; 227: 172–85
 - **Using adjoint-based optimization to enhance ignition in non-premixed jets** *PROCEEDINGS OF THE ROYAL SOCIETY A-MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES*
Qadri, U., Magri, L., Ihme, M., Schmid, P. J.
2021; 477 (2245)
 - **Using adjoint-based optimization to enhance ignition in non-premixed jets.** *Proceedings. Mathematical, physical, and engineering sciences*
Qadri, U. A., Magri, L., Ihme, M., Schmid, P. J.
2021; 477 (2245): 20200472
 - **Analysis of low-temperature chemistry in a turbulent swirling spray flame near lean blow-out** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Mohaddes, D., Xie, W., Ihme, M.
2021; 38 (3): 3435-3443
 - **Structural analysis and regime diagrams of laminar counterflow spray flames with low-temperature chemistry** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*

- Xie, W., Govindaraju, P. B., Ren, Z., Ihme, M.
2021; 38 (2): 3193-3200
- **Pore-resolved simulations of porous media combustion with conjugate heat transfer** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Ferguson, J. C., Sobhani, S., Ihme, M.
2021; 38 (2): 2127-2134
 - **Investigation of CO recombination in the boundary layer of CH₄/O₂ rocket engines** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Perakis, N., Haidn, O. J., Ihme, M.
2021; 38 (4): 6403-6411
 - **Stability diagram and blow-out mechanisms of turbulent non-premixed combustion** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Li, D., Ihme, M.
2021; 38 (4): 6337-6344
 - **Kinetics for the hydrolysis of Ti(OC₃H₇)(₄) : A molecular dynamics simulation study** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Wei, J., Ostadossein, A., Li, S., Ihme, M.
2021; 38 (1): 1433-1440
 - **Analysis of core-noise contributions in a realistic gas-turbine combustor operated near lean blow-out** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Shao, C., Maeda, K., Ihme, M.
2021; 38 (4): 6203-6211
 - **Experimental feasibility of tailored porous media burners enabled via additive manufacturing** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
Sobhani, S., Muhunthan, P., Boigne, E., Mohaddes, D., Ihme, M.
2021; 38 (4): 6713-6722
 - **Pareto-efficient combustion framework for predicting transient ignition dynamics in turbulent flames: Application to a pulsed jet-in-hot-coflow flame** *COMBUSTION AND FLAME*
Douasbin, Q., Ihme, M., Arndt, C.
2021; 223: 153–65
 - **Carbon oxidation in turbulent premixed jet flames: A comparative experimental and numerical study of ethylene, n-heptane, and toluene** *COMBUSTION AND FLAME*
Pineda, D., Paxton, L., Perakis, N., Wei, C., Luna, S., Kahouli, H., Ihme, M., Egolfopoulos, F. N., Spearrin, R.
2020; 221: 371–83
 - **Thermodynamic cycle analysis of superadiabatic matrix-stabilized combustion for gas turbine engines** *ENERGY*
Mohaddes, D., Chang, C. T., Ihme, M.
2020; 207
 - **Modeling Heat-Shield Erosion due to Dust Particle Impacts for Martian Entries**
Palmer, G., Ching, E., Ihme, M., Allofs, D., Guelhan, A.
AMER INST AERONAUTICS ASTRONAUTICS.2020: 857–75
 - **StanShock: a gas-dynamic model for shock tube simulations with non-ideal effects and chemical kinetics** *SHOCK WAVES*
Grogan, K., Ihme, M.
2020; 30 (4): 425-438
 - **Additive Manufacturing of Tailored Macroporous Ceramic Structures for High-Temperature Applications** *ADVANCED ENGINEERING MATERIALS*
Sobhani, S., Allan, S., Muhunthan, P., Boigne, E., Ihme, M.
2020
 - **A two-way coupled Euler-Lagrange method for simulating multiphase flows with discontinuous Galerkin schemes on arbitrary curved elements** *JOURNAL OF COMPUTATIONAL PHYSICS*
Ching, E. J., Brill, S. R., Barnhardt, M., Ihme, M.
2020; 405
 - **Experimental investigation of lean premixed pre-vaporized liquid-fuel combustion in porous media burners at elevated pressures up to 20 bar** *COMBUSTION AND FLAME*
Sobhani, S., Legg, J., Bartz, D. F., Kojima, J. J., Chang, C. T., Sullivan, J. D., Moder, J. P., Ihme, M.

2020; 212: 123–34

- **Modeling Adsorption in Silica Pores via Minkowski Functionals and Molecular Electrostatic Moments** *Energies*
Simeski, F., Boelens, A. M., Ihme, M.
2020; 13 (22)
- **Simultaneous in-situ measurements of gas temperature and pyrolysis of biomass smoldering via X-ray computed tomography.** *Proceedings of the Combustion Institute*
Boigne, E., Bennett, N. R., Wang, A., Mohri, K., Ihme, M.
2020
- **Ensemble Kalman Filter for Assimilating Experimental Data into Large-Eddy Simulations of Turbulent Flows** *FLOW TURBULENCE AND COMBUSTION*
Labahn, J. W., Wu, H., Harris, S. R., Coriton, B., Frank, J. H., Ihme, M.
2019
- **Data Assimilation and Optimal Calibration in Nonlinear Models of Flame Dynamics** *JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER-TRANSACTIONS OF THE ASME*
Yu, H., Jaravel, T., Ihme, M., Juniper, M. P., Magri, L.
2019; 141 (12)
- **Molecular diffusion and phase stability in high-pressure combustion** *COMBUSTION AND FLAME*
Yao, M. X., Hickey, J., Ma, P. C., Ihme, M.
2019; 210: 302–14
- **Numerical Analysis of Heat and Mass Transfer Coupled With Gaseous Fuel Injection in Reactive Porous Media** *JOURNAL OF HEAT TRANSFER-TRANSACTIONS OF THE ASME*
Cheng, Z., Yang, J., Guo, Z., Fu, P., Ihme, M., Wang, Q.
2019; 141 (11)
- **Efficient time-stepping techniques for simulating turbulent reactive flows with stiff chemistry** *COMPUTER PHYSICS COMMUNICATIONS*
Wu, H., Ma, P. C., Ihme, M.
2019; 243: 81–96
- **Closure of the scalar dissipation rate in the spray flamelet equations through a transport equation for the gradient of the mixture fraction** *COMBUSTION AND FLAME*
Olguin, H., Scholtissek, A., Gonzalez, S., Gonzalez, F., Ihme, M., Hasse, C., Gutheil, E.
2019; 208: 330–50
- **A regularized deconvolution model for sub-grid dispersion in large eddy simulation of turbulent spray flames** *COMBUSTION AND FLAME*
Wang, Q., Zhao, X., Ihme, M.
2019; 207: 89–100
- **Examination of diesel spray combustion in supercritical ambient fluid using large-eddy simulations** *INTERNATIONAL JOURNAL OF ENGINE RESEARCH*
Chung, W., Ma, P. C., Ihme, M.
2019
- **A regularized deconvolution method for turbulent closure modeling in implicitly filtered large-eddy simulation** *COMBUSTION AND FLAME*
Wang, Q., Ihme, M.
2019; 204: 341–55
- **On the numerical behavior of diffuse-interface methods for transcritical real-fluids simulations** *INTERNATIONAL JOURNAL OF MULTIPHASE FLOW*
Ma, P. C., Wu, H., Banuti, D. T., Ihme, M.
2019; 113: 231–49
- **X-ray Computed Tomography for Flame-Structure Analysis of Laminar Premixed Flames.** *Combustion and flame*
Boigne, E., Muhunthan, P., Mohaddes, D., Wang, Q., Sobhani, S., Hinshaw, W., Ihme, M.
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