Stanford

Guillaume Vignat

Research Engineer

Mechanical Engineering

Bio

ACADEMIC APPOINTMENTS

- Research Engineer, Mechanical Engineering

PROFESSIONAL EDUCATION

- PhD, University Paris-Saclay, CentraleSupelec , Reacting flows (2020)

Publications

PUBLICATIONS

- **Deep reinforcement learning for adaptive control of thermoacoustic instabilities in a lean-premixed methane/hydrogen/air combustor** *COMBUSTION AND FLAME*
  Akoush, B., Vignat, G., Finley, R., Chung, W., Ihme, M.
  2025; 282

- **A self-consistent analysis of cluster morphology in supercritical carbon dioxide from Small Angle X-ray Scattering** *CHEMICAL PHYSICS LETTERS*
  Muhunthan, P., Majumdar, A., Younes, K., Vignat, G., Li, H., Rajkovic, I., Weiss, T., Sokaras, D., Ihme, M.
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- **Supercritical Ethanol-CO2 Mixtures Exhibit Microscopic Immiscibility: A Combined Study Using X-ray Scattering and Molecular Dynamics Simulations.** *The journal of physical chemistry letters*
  Fan, J., Yoon, T., Vignat, G., Li, H., Younes, K., Majumdar, A., Muhunthan, P., Sokaras, D., Weiss, T., Rajkovic, I., Ihme, M.
  2025: 7090-7099

- **Burn parameters affect PAH emissions at conditions relevant for prescribed fires** *ATMOSPHERIC POLLUTION RESEARCH*
  Topperwien, K., Vignat, G., Feinberg, A. J., Daube, C., Alton, M. W., Fortner, E. C., Canagaratna, M. R., Kling, M. F., Johnson, M., Nadeau, K., Herndon, S., Jayne, J. T., Ihme, et al
  2025; 16 (5)

- **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

- **Integrated experimental and computational analysis of porous media combustion by combining gas-phase synchrotron µCT, 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

- **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)

- **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)
- **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)
- **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)
- **Improving volume-averaged simulations of matrix-stabilized combustion through direct X-ray μCT characterization: Application to NH₃/H₂-air combustion** *COMBUSTION AND FLAME*
  Zirwes, T., Vignat, G., Toro, E. R., Boigne, E., Younes, K., Trimis, D., Ihme, M.
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- **Swirling spray flames dynamical blow out induced by transverse acoustic oscillations** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
  Patat, C., Baillot, F., Blaisot, J., Domingues, E., Vignat, G., Soundararajan, P., Renaud, A., Durox, D., Candel, S.
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- **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.
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- **Experimental and numerical investigation of flame stabilization and pollutant formation in matrix stabilized ammonia-hydrogen combustion** *COMBUSTION AND FLAME*
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- **Dynamics and structure of detonations in stratified product-gas diluted mixtures** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
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- **Comparison of Flame Describing Functions Measured in Single and Multiple Injector Configurations** *JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER-TRANSACTIONS OF THE ASME*
  Soundararajan, P., Durox, D., Vignat, G., Renaud, A., Beaunier, J., Candel, S.
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- **p Swirler effects on combustion instabilities analyzed with measured FDFs, injector impedances and damping rates** *COMBUSTION AND FLAME*
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- **The suitability of different swirl number definitions for describing swirl flows: Accurate, common and (over-) simplified formulations** *PROGRESS IN ENERGY AND COMBUSTION SCIENCE*
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- **A Joint Experimental and Large Eddy Simulation Characterization of the Liquid Fuel Spray in a Swirl Injector** *JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER-TRANSACTIONS OF THE ASME*

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- **Improvement of lean blow out performance of spray and premixed swirled flames using nanosecond repetitively pulsed discharges** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
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- **Investigation of transient PVC dynamics in a strongly swirled spray flame using high speed planar laser imaging of SnO2 microparticles** *COMBUSTION AND FLAME*
  Vignat, G., Durox, D., Renaud, A., Lancien, T., Vicquelin, R., Candel, S.
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- **Effect of Different Fuels on Combustion Instabilities in an Annular Combustor** *JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER-TRANSACTIONS OF THE ASME*
  Soundararajan, P., Vignat, G., Durox, D., Renaud, A., Candel, S.
  2021; 143 (3)
- **Large-Eddy Simulation of Flame Dynamics During the Ignition of a Swirling Injector Unit and Comparison With Experiments** *JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER-TRANSACTIONS OF THE ASME*
  Topperwien, K., Collin-Bastiani, F., Riber, E., Cuenot, B., Vignat, G., Prieur, K., Durox, D., Candel, S., Vicquelin, R.
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- **Combustion Dynamics of Annular Systems** *COMBUSTION SCIENCE AND TECHNOLOGY*
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- **Dynamics of spray and swirling flame under acoustic oscillations : A joint experimental and LES investigation** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
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  Vignat, G., Durox, D., Renaud, A., Candel, S.
  2020; 142 (1)
- **Flame and Spray Dynamics During the Light-Round Process in an Annular System Equipped With Multiple Swirl Spray Injectors** *JOURNAL OF ENGINEERING FOR GAS TURBINES AND POWER-TRANSACTIONS OF THE ASME*
  Prieur, K., Vignat, G., Durox, D., Schuller, T., Candel, S.
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- **HIGH AMPLITUDE COMBUSTION INSTABILITIES IN AN ANNULAR COMBUSTOR INDUCING PRESSURE FIELD DEFORMATION AND FLAME BLOW-OFF**
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- **An experimental study into the effect of injector pressure loss on self-sustained combustion instabilities in a swirled spray burner** *PROCEEDINGS OF THE COMBUSTION INSTITUTE*
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- **FLAME AND SPRAY DYNAMICS DURING THE LIGHT-ROUND PROCESS IN AN ANNULAR SYSTEM EQUIPPED WITH MULTIPLE SWIRL SPRAY INJECTORS**
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  AMER SOC MECHANICAL ENGINEERS.2018
- **ANALYSIS OF PERFORMANCE SENSITIVITY TO GEOMETRICAL VARIATIONS OF A MODERN HELICOPTER ENGINE COMBUSTOR USING LES SIMULATIONS**
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