Marco Mehl, PhD

Associate Professor

Department of Chemistry, Materials and Chemical Engineering "Giulio Natta",
Politecnico di Milano, Milano 20133 – Italy, email: marco.mehl@polimi.it, tel: +390223993367

Research Interests

- Detailed kinetics of combustion and formation of pollutants;
- Combustion of real fuels surrogates;
- Detailed kinetics of biofuels;
- Combustion in internal combustion engines;
- Detailed kinetic models for aviation fuels;
- Numerical modeling of polymer thermal degradation.

Teaching

AA 2017/18 – Current	**Principles of Combustion**
AA 2018/19 – Current	**Numerical Methods for Chemical Engineering**

Education and Career

Dec 2017 - now	**Associate Professor at Politecnico di Milano** Milano, Italy
Feb 2018 - Jan 2011	**Staff Scientist at Lawrence Livermore National Laboratory** Livermore, CA, USA
Feb 2008 – Jan 2011	**Post-doctoral Fellow at Lawrence Livermore National Laboratory** Livermore, CA, USA
May 2007 -Dec 2007	**Research Fellow at Politecnico di Milano** Milano, Italy
Jan 2005 – Dec 2007	**Teaching Assistant for the courses of "Sperimentazione Industriale" (Error Analysis, 2005-2007) and "Combustione e Formazione di Inquinanti" (Combustion and pollutants formation, 2007)** Politecnico di Milano – Italy
Jan 2004 – May 2007	**PhD Fellowship at Politecnico di Milano,** Department of Chemical Engineering and Industrial Chemistry Milano, Italy
Jan 2003 - Dec2003	**Graduate researcher at Politecnico di Milano,** Department of Chemical Engineering and Industrial Chemistry

	Milano, Italy
2007	**Ph.D. Chemical Engineering and Industrial Chemistry** Politecnico di Milano – Italy "Autoignition Phenomena in Internal Combustion Engines"
2002	**M.S. Chemical Engineering** Politecnico di Milano – Italy "Cinetiche di Degrado Termico di Polimeri e Additvi Alogenati" ("Kinetic Modeling of Pyrolysis of Halogenated Polymers and Flame-Retardants")

Recent Publications and Technical Papers

Zhang, K., Banyon, C., Burke, U., Kukkadapu, G., Wagnon, S.W., Mehl, M., Curran, H.J., Westbrook, C.K., Pitz, W.J., ***An experimental and kinetic modeling study of the oxidation of hexane isomers: Developing consistent reaction rate rules for alkanes,***(2019) Combustion and Flame, 206, pp. 123-137.

Koroglu, B., Mehl, M., Crowhurst, J.C., Zaug, J.M., Rose, T.P., Radousky, H.B., Armstrong, M.R., ***Experimental and modeling study of chemical-based strategies for mitigating dust formation in fusion reactors,*** (2019) Plasma Physics and Controlled Fusion, 61 (4), art. no. 045007.

Fridlyand, A., Goldsborough, S.S., Al Rashidi, M., Sarathy, S.M., Mehl, M., Pitz, W.J., ***Low temperature autoignition of 5-membered ring naphthenes: Effects of substitution,*** (2019) Combustion and Flame, 200, pp. 387-404.

Chen, B., Wang, Z., Wang, J.-Y., Wang, H., Togbé, C., Alonso, P.E., Almalki, M., Mehl, M., Pitz, W.J., Wagnon, S.W., Zhang, K., Kukkadapu, G., Dagaut, P., Mani Sarathy, S., ***Exploring gasoline oxidation chemistry in jet stirred reactors,*** (2019) Fuel, 236, pp. 1282-1292.

Davidson, D.F., Shao, J.K., Choudhary, R., Mehl, M., Obrecht, N., Hanson, R.K., ***Ignition delay time measurements and modeling for gasoline at very high pressures,*** (2019) Proceedings of the Combustion Institute, 37 (4), pp. 4885-4892.

Kang, D., Fridlyand, A., Goldsborough, S.S., Wagnon, S.W., Mehl, M., Pitz, W.J., McNenly, M.J., **Auto-ignition study of FACE gasoline and its surrogates at advanced IC engine conditions,** (2019) Proceedings of the Combustion Institute, 37 (4), pp. 4699-4707.

Ahmed, A., Pitz, W.J., Cavallotti, C., Mehl, M., Lokachari, N., Nilsson, E.J.K., Wang, J.-Y., Konnov, A.A., Wagnon, S.W., Chen, B., Wang, Z., Kim, S., Curran, H.J., Klippenstein, S.J., Roberts, W.L., Sarathy, S.M., ***Small ester combustion chemistry: Computational kinetics and experimental study of methyl acetate and ethyl acetate,*** (2019) Proceedings of the Combustion Institute, 37 (1), pp. 419-428.

Koroglu, B., Wagnon, S., Dai, Z., Crowhurst, J.C., Armstrong, M.R., Weisz, D., Mehl, M., Zaug, J.M., Radousky, H.B., Rose, T.P., ***Gas phase chemical evolution of uranium, aluminum, and iron oxides,*** (2018) Scientific Reports, 8 (1), art. no. 10451.

Wang, M., Zhang, K., Kukkadapu, G., Wagnon, S.W., Mehl, M., Pitz, W.J., Sung, C.-J., ***Autoignition of trans-decalin, a diesel surrogate compound: Rapid compression machine experiments and chemical kinetic modeling,*** (2018) Combustion and Flame, 194, pp. 152-163.

Wagnon, S.W., Thion, S., Nilsson, E.J.K., Mehl, M., Serinyel, Z., Zhang, K., Dagaut, P., Konnov, A.A., Dayma, G., Pitz, W.J.

Experimental and modeling studies of a biofuel surrogate compound: laminar burning velocities and jet-stirred reactor measurements of anisole, (2018) Combustion and Flame, 189, pp. 325-336.

Westbrook, C.K., Mehl, M., Pitz, W.J., Kukkadapu, G., Wagnon, S., Zhang, K.,
Multi-fuel surrogate chemical kinetic mechanisms for real world applications,
(2018) Physical Chemistry Chemical Physics, 20 (16), pp. 10588-10606.

Goldsborough, S.S., Fridlyand, A., West, R., McNenly, M., Mehl, M., Pitz, W.J., ***Quantifying Uncertainty in Predictions of Kinetically Modulated Combustion: Application to HCCI Using a Detailed Transportation Fuel Model,*** (2018) SAE Technical Papers, 2018-April, .

Szybist, J.P., Wagnon, S.W., Splitter, D., Pitz, W.J., Mehl, M., ***The Reduced Effectiveness of EGR to Mitigate Knock at High Loads in Boosted SI Engines,***(2017) SAE International Journal of Engines, 10 (5).

Koroglu, B., Mehl, M., Armstrong, M.R., Crowhurst, J.C., Weisz, D.G., Zaug, J.M., Dai, Z., Radousky, H.B., Chernov, A., Ramon, E., Stavrou, E., Knight, K., Fabris, A.L., Cappelli, M.A., Rose, T.P., ***Plasma flow reactor for steady state monitoring of physical and chemical processes at high temperatures,*** (2017) Review of Scientific Instruments, 88 (9), art. no. 093506, .

Singh, E., Badra, J., Mehl, M., Sarathy, S.M., ***Chemical Kinetic Insights into the Octane Number and Octane Sensitivity of Gasoline Surrogate Mixtures,*** (2017) Energy and Fuels, 31 (2), pp. 1945-1960.

Chen, Y., Mehl, M., Xie, Y., Chen, J.-Y., ***Improved skeletal reduction on multiple gasoline-ethanol surrogates using a Jacobian-aided DRGEP approach under gasoline compression ignition (GCI) engine conditions,*** (2017) Fuel, 210, pp. 617-624.

Westbrook, C.K., Mehl, M., Pitz, W.J., Sjöberg, M., ***Chemical kinetics of octane sensitivity in a spark-ignition engine,*** (2017) Combustion and Flame, 175, pp. 2-15.

Al Rashidi, M.J., Mehl, M., Pitz, W.J., Mohamed, S., Sarathy, S.M., ***Cyclopentane combustion chemistry. Part I: Mechanism development and computational kinetics,*** (2017) Combustion and Flame, 183, pp. 358-371.

Chen, Y., Wolk, B., Mehl, M., Cheng, W.K., Chen, J.-Y., Dibble, R.W., ***Development of a reduced chemical mechanism targeted for a 5-component gasoline surrogate: A case study on the heat release nature in a GCI engine,*** (2017) Combustion and Flame, 178, pp. 268-276.