

Leonel R. Cancino

Prof., D.Eng., M.Eng., B.Eng

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*Internal Combustion Engines Laboratory - LABMCI
Mobility Engineering Department - EMB
Federal University of Santa Catarina - UFSC Joinville*

Professional Experience

- 09/2013–Present **Established Professor**, Federal University of Santa Catarina, Campus Joinville.
- 05/2014–Present **Internal Combustion Engines Laboratory**, Director.
- 11/2009–12/2012 **Research Scientist**, Fundação Stemmer para Pesquisa, Desenvolvimento e Inovação (FEESC).
- 11/2009–12/2012 **Post-doctoral Research**, Institute for Combustion and Gas Dynamics – Reactive Fluids / University of Duisburg Essen, Duisburg, Germany.
- 11/2009–12/2012 **Post-doctoral Research**, Combustion and Thermal Systems Engineering Laboratory / Federal University of Santa Catarina, Florianópolis, Brazil.
- 01/2011–05/2011 **Post-doctoral Research**, Combustion Chemistry Centre / National University of Ireland, Galway, Ireland.

Education

- 11/2005–08/2009 **Doctor of Engineering / Mechanical Engineering / Thermal Sciences**, Federal University of Santa Catarina, Florianópolis / Brazil.
- 04/2002–09/2005 **Master of Engineering / Mechanical Engineering / Thermal Sciences**, Federal University of Santa Catarina, Florianópolis / Brazil.
- 07/1996–11/2001 **Bachelor of Engineering / Mechanical Engineering**, Francisco de Paula Santander University, Cúcuta / Colombia.

Professional Development

Teaching

- 2013–Present **EMB 5302 - Internal Combustion Engines I**, UFSC Joinville, Automotive Engineering.
- 2013–Present **EMB 5317 - Aerodynamic of Road Vehicles**, UFSC Joinville, Automotive Engineering.
- 2015–Present **EMB 5383 - Applied CFD**, UFSC Joinville, Automotive Engineering.
- 2013–Present **EMB 5328 - Internal Combustion Engines II**, UFSC Joinville, Automotive Engineering.
- 2019–Present **EMC 410197 - Combustion chemical kinetics - Detailed kinetics mechanisms and thermodynamic databases**, UFSC Florianópolis, Graduate Program in Mechanical Engineering - POSMEC.
- 2020–Present **EMC 410111 - Introduction to Combustion**, UFSC Florianópolis, Graduate Program in Mechanical Engineering - POSMEC.
- 2013–2014 **EMB 5412 - Aerospace Propulsion I**, UFSC Joinville, Aerospace Engineering.

Research

- Experimental **High Pressure Shock Tube**, Ignition delay time measurements.
- Experimental **Rapid Compression Machines**, Ignition delay time measurements.
- Experimental **Internal Combustion Engines**, Performance parameters measurements.
- Numerical **Computational Reactive Fluid Dynamics - CRFD**, 3D Combustion systems simulations.

Numerical **Detailed Chemical Kinetics**, *Numerical simulations*, 0D and 1D Combustion system simulations.

Research Supervisor

2020–Present **Doctoral Thesis**, 4 D.Eng students currently under supervision.

2018–Present **Master Thesis**, 3 M.Eng students graduated, 6 currently under supervision.

2014–Present **Bachelor Thesis**, 18 B.Eng students graduated, 4 currently under supervision.

Research Areas

Fuel formulation and development.

Fuel Surrogates and Detailed chemical kinetics .

Ethanol combustion.

Computational Reactive Fluid Dynamics.

Internal Combustion Engines.

Vehicular Aerodynamics.

Collaborative Research Activity

Combustion Chemistry Centre - C3NUIG, Prof. Henry Curran, Ireland.

Institute for Combustion and Gas Dynamics – Reactive Fluids - IVG/UDE, Prof. Christof Schulz, Germany.

Petróleo Brasileiro S.A - Petrobras, Eng. Ana Carolina Bueno Bontorin, Brazil.

Awards

05/2002–05/2004 **Master Fellowship**, CNPq, Brazil.

11/2005–12/2008 **Doctoral Fellowship**, CNPq, Brazil.

07/2007–12/2007 **Doctoral Stay Fellowship**, DAAD, Germany.

01/2008–06/2008 **Doctoral Stay Fellowship**, University of Duisburg Essen, Germany.

11/2009–05/2010 **Promotion Stipendium (Researcher)**, University of Duisburg Essen, Germany.

CV and Citation databases

Scopus, <https://www.scopus.com/authid/detail.uri?authorId=26321361200>.

ORCID, <https://orcid.org/0000-0001-8435-9026>.

Web of Science, <https://publons.com/researcher/P-8809-2014/>.

CV Lattes, <http://lattes.cnpq.br/1305995640333184>.

Publications

International peer-reviewed journal publications

11. Cancino, L.R. ; A. da Silva Jr. ; A.R. De Toni ; M. Fikri ; A.A.M. Oliveira ; C. Schulz ; H.J. Curran., “**A SIX-COMPOUND, HIGH PERFORMANCE GASOLINE SURROGATE FOR INTERNAL COMBUSTION ENGINES: EXPERIMENTAL AND NUMERICAL STUDY OF AUTOIGNITION USING HIGH-PRESSURE SHOCK TUBES**”, *Fuel (Guildford)* **v. 261**, 116439 (2020).
10. A. da Silva Jr. ; J. Hauber. ; Cancino, L.R. ; K. Huber, “**THE RESEARCH OCTANE NUMBERS OF ETHANOL-CONTAINING GASOLINE SURROGATES**”, *Fuel (Guildford)* **V. 243**, p. 306–313 (2019).
9. R.C. Catapan. ; Cancino, L.R. ; A.A.M. Oliveira. ; C.O. Schwarz. ; H. Nitschke. ; T. Frank., “**POTENTIAL FOR ONBOARD HYDROGEN PRODUCTION IN AN DIRECT INJECTION ETHANOL FUELED SPARK IGNITION ENGINE WITH EGR**”, *Fuel (Guildford)* **V. 234**, p. 441–446 (2018).
8. De Toni, A.R. ; Werler, M. ; Hartmann, R.M. ; Cancino, L.R. ; Schießl, R. ; Fikri, M. ; Schulz, C. ; Oliveira, A.A.M. ; Oliveira, E.J. ; Rocha, M.I., “**IGNITION DELAY TIMES OF JET A-1 FUEL: MEASUREMENTS**

- IN A HIGH-PRESSURE SHOCK TUBE AND A RAPID COMPRESSION MACHINE”, *Proceedings of the Combustion Institute* v. **36**, p. 3695–3703 (2017).
7. Werler, M. ; Cancino, L.R. ; Schießl, R. ; Maas, U. ; Schulz, C. ; Fikri, M., “IGNITION DELAY TIMES OF DIETHYL ETHER MEASURED IN A HIGH-PRESSURE SHOCK TUBE AND A RAPID COMPRESSION MACHINE”, *Proceedings of the Combustion Institute* v. **35**, p. 259–266 (2015).
 6. Fikri, M. ; Cancino, L.R. ; HARTMANN, M. ; Schulz, C., “HIGH-PRESSURE SHOCK-TUBE INVESTIGATION OF THE IMPACT OF 3-PENTANONE ON THE IGNITION PROPERTIES OF PRIMARY REFERENCE FUELS”, *Proceedings of the Combustion Institute* v. **34**, p. 393–400 (2013).
 5. Ramirez L.H.P. ; Fikri M. ; Cancino, L.R. ; Moréac G. ; Schulz C. ; Dagaut P., “AUTOIGNITION OF SURROGATE BIODIESEL FUEL (B30) AT HIGH PRESSURES: EXPERIMENTAL AND MODELING KINETIC STUDY”, *Combustion and Flame* v. **159**, p. 996–1008 (2012).
 4. Cancino, L.R. ; Fikri, M. ; Oliveira, A.A.M. ; Schulz, C., “IGNITION DELAY TIMES OF ETHANOL-CONTAINING MULTI-COMPONENT GASOLINE SURROGATES: SHOCK-TUBE EXPERIMENTS AND DETAILED MODELING”, *Fuel (Guildford)* v. **90**, p. 1238–1244 (2011).
 3. Cancino, L.R. ; Fikri, M ; Oliveira, A.A.M. ; Schulz, C., “MEASUREMENT AND CHEMICAL KINETICS MODELING OF SHOCK-INDUCED IGNITION OF ETHANOL-AIR MIXTURES”, *Energy & Fuels*, v. **24**, p. 2830–2840 (2010).
 2. Cancino, L.R. ; Fikri, M ; Oliveira, A.A.M. ; Schulz, C., “AUTOIGNITION OF GASOLINE SURROGATE MIXTURES AT INTERMEDIATE TEMPERATURES AND HIGH PRESSURES: EXPERIMENTAL AND NUMERICAL APPROACHES”, *Proceedings of the Combustion Institute* v. **32**, p. 501–50 (2008).
 1. Cancino, L.R. ; Restrepo, A.H ; Oliveira, A.A.M., “ANÁLISIS NUMÉRICO DE LA COMBUSTIÓN EN UN QUEMADOR ATMOSFERICO TIPO CORONA DE APLICACIÓN DOMESTICA”, *Scientia et Technica Año XIII, Agosto de 2007. Universidad Tecnológica de Pereira* v. **35**, p. 201–206 (2007).

Conference papers

30. Bonini, V.R.B. ; de Sousa, M.A. ; Balestrin, K.M. ; Vicente, J. ; Cancino, L.R., “THE FORMATION OF NITRIC OXIDE IN FLAMES: A NUMERICAL ASSESSMENT USING DETAILED CHEMICAL KINETICS”, *Proceedings of COBEM 2021 - 26th International Congress of Mechanical Engineering - COBEM2021* v. **1**, COBEM-2021-1185 (2021).
29. de Sousa, M.A. ; Bonini, V.R.B. ; Balestrin, K.M. ; Vicente, J. ; Cancino, L.R., “NEGATIVE TEMPERATURE COEFFICIENT - THE INFLUENCE ON FUEL SURROGATE FORMULATION”, *Proceedings of COBEM 2021 - 26th International Congress of Mechanical Engineering - COBEM2021* v. **1**, COB-2021-1197 (2021).
28. Balestrin, K.M. ; Vicente, J. ; Bonini, V.R.B. ; de Sousa, M.A. ; Cancino, L.R., “REDUCED KINETICS MODELS FOR GASOLINE SURROGATES”, *Proceedings of COBEM 2021 - 26th International Congress of Mechanical Engineering - COBEM2021* v. **1**, COB-2021-1251 (2021).
27. Rotter, D.V. ; Hackbarth, G.Z. ; Henschel Jr. J.A ; Cancino, L.R., “SPRAY AND COMBUSTION BEHAVIOR IN A LOCOMOTIVE ENGINE USING DIESEL / BIODIESEL BLENDS: A CRFD ANALYSIS”, *Proceedings of COBEM 2021 - 26th International Congress of Mechanical Engineering - COBEM2021* v. **1**, COB-2021-0706 (2021).
26. A.C. Caetano, A.M.S. da Costa, K.M. Caetano, N.M. Caetano, D.F. da Silva, Cancino, L.R., “FUGITIVE EMISSIONS IN MOBILE SOURCES - AN EXPERIMENTAL ANALYSIS IN DIESEL-POWERED VEHICLES REGULATED BY THE EURO V STANDARD”, *Proceedings of COBEM 2021 - 26th International Congress of Mechanical Engineering - COBEM2021* v. **1**, COBEM-2021-1299 (2021).
25. Gutierrez, J.E.C. ; Duarte, L.E.V. ; Oliveira Jr., A.A.M. ; Cancino, L.R., “THE AHMED BODY’S EXTERNAL AERODYNAMICS AT 25° SLANT ANGLE REAR SURFACE: A NUMERICAL ANALYSIS USING CFD”, *Proceedings of the 18th Brazilian Congress of Thermal Sciences and Engineering - ENCIT2020* v. **1**, ENC-2020-0060 (2020).

24. Barrera, L.T.M. ; Carrillo, M.P. ; Cancino, L.R., “NUMERICAL SIMULATION OF A FOUR CYLINDER, FOUR STROKE SPARK IGNITION ENGINE USING ETHANOL / GASOLINE BLENDS”, *Proceedings of the 18th Brazilian Congress of Thermal Sciences and Engineering - ENCIT2020* v. 1, ENC-2020-0103 (2020).
23. Jacome, C.M.P. ; Duarte, L.E.V. ; Garzon, N.A.N. ; Oliveira Jr., A.A.M. ; Cancino, L.R., “NUMERICAL ANALYSIS OF A SINGLE-CYLINDER COMPRESSION IGNITION ENGINE FUELED WITH DIESEL AND STRAIGHT SOYBEAN OIL-DIESEL BLENDS”, *Proceedings of the 18th Brazilian Congress of Thermal Sciences and Engineering - ENCIT2020* v. 1, ENC-2020-0206 (2020).
22. Romano, A. ; Cancino, L.R., “A SIMPLIFIED MODEL FOR COMPRESSION-IGNITION INTERNAL COMBUSTION ENGINES ANALYSIS BY USING DETAILED CHEMICAL KINETICS”, *Proceedings of the 18th Brazilian Congress of Thermal Sciences and Engineering - ENCIT2020* v. 1, ENC-2020-0069 (2020).
21. Kraus, F.C. ; Oliveira Jr., A.A.M. ; Bontorin, A.C.B. ; Santos, A.R. ; Cancino, L.R., “*i*-PENTANE AND *i*-PENTENE AS GASOLINE SURROGATES FOR THE TRANSPORT INDUSTRY: A NUMERICAL ANALYSIS ON IGNITION DELAY TIMES USING DETAILED CHEMICAL KINETICS”, *Proceedings of the 18th Brazilian Congress of Thermal Sciences and Engineering - ENCIT2020* v. 1, ENC-2020-0512 (2020).
20. Leandro, V.M. ; Cancino, L.R., “RACING CARS AERODYNAMICS: A NUMERICAL ANALYSIS USING A SIMPLIFIED GEOMETRY”, *Proceedings of the 25th ABCM International Congress of Mechanical Engineering - COBEM2019* v. 1, COBEM2019-1969 (2019).
19. Henschel Jr. J.A. ; Cancino, L.R., “NUMERICAL ANALYSIS OF FUEL SPRAY ANGLE ON THE OPERATING PARAMETERS IN A LOCOMOTIVE DIESEL ENGINE”, *Proceedings of the 25th ABCM International Congress of Mechanical Engineering - COBEM2019* v. 1, COBEM2019-1642 (2019).
18. Adão, W.B. ; Cancino, L.R., “SPRAY BEHAVIOR ON COMPRESSION IGNITION INTERNAL COMBUSTION ENGINES: A CFD ANALYSIS OF CAVITATION IN THE FUEL INJECTOR”, *Proceedings of the 25th ABCM International Congress of Mechanical Engineering - COBEM2019* v. 1, COBEM2019-2161 (2019).
17. Alves, J.V. ; Cancino, L.R., “THE EFFECTS OF VARIABLE-LENGTH INTAKE MANIFOLD ON ENGINE PERFORMANCE: LITERATURE REVIEW AND NUMERICAL STUDY ON HCCI ENGINE”, *Proceedings of the 24th ABCM International Congress of Mechanical Engineering - COBEM2017* v. 1, COBEM2017-1693 (2017).
16. Sánchez, O.Y. ; Cancino, L.R. ; Oliveira, A.A.M., “SIMULAÇÃO NUMÉRICA MULTIDIMENSIONAL DA ADMISSÃO E COMPRESSÃO EM UM MOTOR DE COMBUSTÃO INTERNA DE IGNIÇÃO POR COMPRESSÃO”, *Jornadas Iberoamericanas de Motores Térmicos y Lubricación - MTL2016 - La Plata* v. 1, p. 415–431 (2016).
15. Mello, R.F. ; Deyna, A. ; Wenck, F. ; Cancino, L.R., “A NUMERICAL STUDY OF GASOLINE SURROGATE COMBUSTION ON HOMOGENEOUS CHARGE COMPRESSION IGNITION ENGINES”, *Proceedings of ENCIT 2014 - 15th Brazilian Congress of Thermal Sciences and Engineering* v. 1, ENCIT2014-0248 (2014).
14. Oliveira, L.A. ; Cancino, L.R. ; Oliveira, A.A.M., “SHOCK WAVE / BOUNDARY LAYER INTERACTION: A CFD ANALYSIS OF SHOCK WAVE PROPAGATION IN SHOCK TUBE EXPERIMENTS”, *21st International Shock Interaction Symposium (ISIS21) - IOFFE - Institute of Russian Academy of Sciences* v. 1, p. 91–95 (Riga, Latvia 3 - 8 August 2014).
13. de Oliveira, A.L. ; de Toni, A.R. ; Cancino, L.R. ; Oliveira, A.A.M., Oliveira, E.J. ; Rocha, M.I., “COMPUTATIONAL FLUID DYNAMICS ANALYSIS OF DIFFERENT GEOMETRIES FOR A JET STIRRED REACTOR FOR FUEL RESEARCH”, *Proceedings of the 22nd International Congress of Mechanical Engineering - COBEM 2013* v. 1, COBEM2013-0571 - p. 2698-2709 (2013).
12. Oliveira, J. G. ; Medeiros, C.R. ; Cancino, L.R. ; Oliveira, A.A.M., Oliveira, E.J. ; Rocha, M.I., “AVIATION AND AUTOMOTIVE FUEL SURROGATES: REVIEW OF NUMERICAL AND EXPERIMENTAL WORKS”, *Proceedings of the 22nd International Congress of Mechanical Engineering - COBEM 2013* v. 1, COBEM2013-0741 - p. 3531-3542 (2013).
11. de Toni, A.R. ; de Oliveira, A.L. ; Cancino, L.R. ; Oliveira, A.A.M., Oliveira, E.J. ; Rocha, M.I., “ANALYSIS OF THE COMBUSTION OF REFERENCE FUELS AS AN AID TO THE DEVELOPMENT OF A

- PERFECTLY STIRRED REACTOR FOR FUEL RESEARCH”, *Proceedings of the 22nd International Congress of Mechanical Engineering - COBEM 2013* v. 1, COBEM2013-0555 - p. 2618-2623 (2013).
10. Cancino, L.R. ; Oliveira, A.A.M., Oliveira, E.J. ; Rocha, M.I., “ISOCETANE (*i*-C₁₆H₃₄), HEXADECANE (*n*-C₁₆H₃₄) AND METHYLCYCLOHEXANE (C₇H₁₄) AS JET-FUEL SURROGATES: A NUMERICAL STUDY OF IGNITION DELAY TIME”, *Proceedings of the 22nd International Congress of Mechanical Engineering - COBEM 2013* v. 1, COBEM2013-0534 - p. 2499-2505 (2013).
 9. Cancino, L.R. ; Fikri, M ; Oliveira, A.A.M. ; Schulz, C., “THERMAL OXIDATION OF ETHANOL: EXPERIMENTAL AND NUMERICAL ANALYSIS OF IGNITION CHEMISTRY OF ETHANOL-AIR MIXTURES IN SHOCK-HEATED GASES”, *27th International Symposium on Shock Waves (ISSW27) - - IOFFE - Institute of Russian Academy of Sciences* v. 1, p.137–142 (St. Petersburg, 19..24 July 2009).
 8. Cancino, L.R. ; Fikri, M ; Oliveira, A.A.M. ; Schulz, C., “COMPUTATIONAL FLUID DYNAMIC SIMULATION OF A NON-REACTIVE PROPAGATING SHOCK WAVE IN A SHOCK TUBE”, *27th International Symposium on Shock Waves (ISSW27) - - IOFFE - Institute of Russian Academy of Sciences* v.1, p. 333–338 (St. Petersburg, 19..24 July 2009).
 7. Cancino, L.R. ; Fikri, M ; Oliveira, A.A.M. ; Schulz, C., “SHOCK-TUBE STUDY OF THE IGNITION DELAY TIMES OF ETHANOL AT HIGH PRESSURES AND INTERMEDIATES TEMPERATURES - EXPERIMENTAL AND NUMERICAL APPROACHES”, *Fall Technical Meeting of the Eastern States Section of the Combustion Institute 2007 "Chemical and Physical Processes in Combustion"* v. 01, p. 82-87 (2007).
 6. Cancino, L.R. ; Oliveira, A.A.M., “A NUMERICAL STUDY OF THE HEAT RECIRCULATION ACROSS THE FLAME-SOLID INTERFACE IN RIM-STABILIZED PROPANE AND NBTANE FLAMES”, *Proceedings of COBEM 2007 - 19th International Congress of Mechanical Engineering* v. 1, COBEM2007-1764 (2007).
 5. Cancino, L.R. ; Oliveira, A.A.M., “ANALYSIS AND COMPARISON OF TWO DETAILED KINETIC MODELS FOR THE THERMAL OXIDATION OF ETHANOL-OXYGEN MIXTURES IN HIGH TEMPERATURES”, *Proceedings of the 11th Brazilian Congress of Thermal Sciences and Engineering – ENCIT 2006* v. 1, ENCIT2006-CIT06-0456 (2006).
 4. Cancino, L.R. ; Oliveira, A.A.M, “ANÁLISIS NUMÉRICO DEL PROCESO DE COMBUSTIÓN EN UN QUEMADOR TIPO FLAUTA DE APLICACIÓN DOMESTICA”, *Memorias Del Tercer Congreso Internacional de Ingeniería Mecánica* v. 1, UNAL - Bogotá (2006).
 3. Cancino, L.R. ; Oliveira, A.A.M, “INFLUÊNCIA DA INSATURAÇÃO DO CARBONO SOBRE O EQUILIBRIO QUÍMICO E IGNIÇÃO TÉRMICA DE HIDROCARBONETOS ALIFÁTICOS EM AR”, *Proceedings of the X Latin American Congress Of Heat And Mass Transfer* v. 1, USB - Caracas (2005).
 2. Cancino, L.R. ; Oliveira, A.A.M., “ANALYSIS OF THE THERMAL IGNITION AND INDUCTION TIME OF PREMIXED ETHANOL AND AIR COMBUSTION”, *Proceedings of COBEM 2005 - 18th International Congress of Mechanical Engineering* v. 1, COBEM2005-0959 (2005).
 1. Cancino, L.R. ; Oliveira, A.A.M., “ANALISE COMPUTACIONAL DAS CONDIÇÕES DE IGNIÇÃO DE MISTURAS DE HIDROCARBONETOS COM AR EM REATORES PERFEITAMENTE MISTURADOS”, *Proceedings of the 10th Brazilian Congress of Thermal Sciences and Engineering - ENCIT 2004* v. 1, CIT04-0396 (2004).