

# RESUME



## I. Personal Information

- **Name:** Luis Alonso Díaz-Robles
- **Nationality:** Chilean
- **Date of Birth:** November 10, 1967, Location of Birth: Ovalle, Chile
- **Marital Status:** Married and two kids
- **Address:** Alonso de Camargo 8908, Depto. 126, Las Condes, Santiago, Chile.

## II. Present Occupation

Full Professor  
Department of Chemical Engineering  
Universidad de Santiago de Chile, Chile  
Cellphone: +56 9 7977 5810  
E-mails: [alonso.diaz.r@usach.cl](mailto:alonso.diaz.r@usach.cl), [luisdiazrobles@gmail.com](mailto:luisdiazrobles@gmail.com)

## III. Academic Background

Period	Major, degree, institution, country
2005	Ph.D. in Civil Engineering (Air Quality and Air Pollution Control), Department of Civil & Environmental Engineering, University of Tennessee, Knoxville, Tennessee, United States.
2005	Minor in Statistics, Department of Statistics, University of Tennessee, Knoxville, Tennessee, United States.
1993	Chemical Civil Engineer, Department of Chemical Engineering, Universidad de Santiago de Chile, Chile.
1992	BS in Sciences of Engineering, Department of Chemical Engineering, Universidad de Santiago de Chile, Chile. Research and Consulting Experience

#### **IV. Research Experience**

Dr. Díaz-Robles got his PhD of Environmental Engineering in the Department of Civil and Environmental Engineering at The University of Tennessee, Knoxville (2002-2005). He was the President of the A&WMA Student Chapter at the University of Tennessee Knoxville (2003-2004). In that academic period the Student Chapter was awarded with the first place for large-size institutions in the Air & Waste Management Association's 97<sup>th</sup> Annual Conference & Exhibition.

He has been actively involved in numerous air quality related research projects and renewable energies (biomass). His professional interests include environmental impacts of energy production, distribution, and use; assessment of renewable and sustainable energy systems; air quality impacts of biomass to biofuels conversion; air quality impacts of vehicle emissions; air quality impacts and air pollution control of the residential wood combustion, biomass hydrothermal carbonization, and impacts of advanced-technology fuels and vehicles on emissions and energy use. He also has been involved in the interface between politics and environmental science, particularly in the areas of energy policy, renewable fuels, greenhouse gases, and climate change.

His experience covers a broad range of areas, from emission inventory development and processing, to emission factors, advanced air quality modeling (WRF, SMOKE, CMAQ, CALPUFF, BenMAP, OpenAir), air quality forecasting models, air quality monitoring, emissions data acquisition, and health risk assessment, including the assessment of the effects produced by renewable energy uses in air quality, mainly biofuels and forest biomass. Currently, he is a Full Professor at the Department of Chemical Engineering and Director of the Air Quality Management and Air Pollution Control diploma graduate program at the Universidad de Santiago de Chile and CEO of the Particulotech Air Quality Engineering Ltda.. He was the Director of the Air Quality Unit for 9 years and associate professor during 16 years at the Catholic University of Temuco, Chile (1998-2014). His line of research includes air quality assessment and air advanced quality modeling, specifically in particulate matter, ozone, and toxic substances, characterizing and assessing the impact and risk on human health in the basis of the analysis of different scenarios of future and emission sources, including a change in technology, regulations and fuels, especially biofuels (hydrothermal carbonization). Since 2005, his work has let him be recognized in an international level, highlighting his active participation in the editorial board of the Atmospheric Chemistry Session, Technical Counsel of the Air & Waste Management Association, where he chaired the Atmospheric Chemistry Session between 2010-2012, and was a member of the editorial board of the 'Critical Review' of the Air & Waste Management Association journal.

He has published several scientific articles and project results in national and international congress proceedings with editorial board and has participated as a lecturer and editor of various international air quality congresses, highlighting the A&WMA's International Specialty Conference on Leapfrogging Opportunities for Air Quality Improvement, Xi'an, China (2010). Recently, he has been invited to participate in the editorial board of the International Journal of Alternative Energy and the Electronic Journal of Energy & Environment. In a Chilean national level, and since 2006, he has been awarded 1

FONDECYT (Chilean National Fund for Scientific and Technological Development) project as director, 8 FONDEF (Chilean Fund for the Promotion of Scientific and Technological Development) projects, 2 as the director, 2 as the alternate director, and 1 as investigator; 1 CONICYT-BMBF (Germany) as the director, 1 FONIS (Chilean National Fund for Health Research) project as director, and 1 INNOVA-CORFO project as the alternate director; all of them awarded within national and international networks. One of these FONDEF project was selected by CONICYT (Chilean NSF) as “**The 10 scientific achievements of 2013**”. This has let him be nationally recognized as an expert in atmospheric pollution, and form a solid internal research team, which includes doctors, masters, postgraduate students, engineers, and engineering students; and a strong external team formed by prominent and experienced researchers from the US and Germany.

## V. Management and Leadership Experience

Dr. Díaz-Robles was the Dean of the College of Engineering (2009-2012) at the Catholic University of Temuco. He provided leadership and vision and oversees all aspects of the College's activities, including, strategic planning, academic planning and faculty recruitment, budgetary and personnel matters, fund raising, and management and development of physical resources. Dr. Díaz-Robles was responsible for developing relations and enhancing connections with leaders from other disciplines, schools, and industry and for raising the College's profile both within the University and externally, in national and international contexts. So far, the College of Engineering has a total of 60 full-time faculties, lecturers, and staff members, 1300 students. The College offered one MS degree, and six B.S. degrees; Environmental Engineering, Chemical Engineering, Informatics Engineering, Accounting, Commercial Engineering, Industrial Engineering, and a Common Engineering Plan. During his administration, 5 International Collaboration Agreements were signed; University of Tennessee (UTK), Technical University of Berlin (Germany), University of Rutherford (Germany), Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT from Spain), and the Escuela Politécnica Nacional de Quito (EPN), Ecuador.

Dr. Díaz-Robles was the Director of the Air Quality Unit (2006-2014). He was responsible for the operation of Laboratories, including oversight and leadership for Strategic Planning for it and supporting research and consultant activities. His responsibilities included assisting faculty in identifying new multidisciplinary research opportunities, reviewing project proposals, managing grants and contracts and developing research collaborations with North American Universities, European Universities, Chilean Universities, International Associations, and local Government Agencies.

Dr. Díaz-Robles was the Head of the School of Environmental Engineering (SEE) between January 2006 and January 2008. He was responsible for the operation of the School, including oversight and leadership for Strategic Planning for the School, current graduate and undergraduate programs, development of new programs, and support of research activities. His responsibilities included mentoring new faculties, assisting faculty in identifying new multidisciplinary research opportunities, reviewing project proposals, managing grants and contracts and developing research collaborations with North American Universities, Chilean Universities, International Associations, and local

Government Agencies. Dr. Díaz-Robles has also been responsible for fiscal planning and resource management, supervising office staff and technicians. Actually, the SEE has a total of 13 full-time faculties, lecturers, and staff members. The SEE offers three B.S., Environmental Engineering, Chemical Engineering, and Industrial Engineering, and one M.S. in Environmental Engineering.

As Process Refinery Engineer at the Unilever Chile S.A. (1993-1997), Dr. Díaz-Robles was responsible for the operation, production, and health and safety of the two oil refinery plants, Lontue Plant and Panamericana Norte Plant. It included leadership for 145 employees at Lontue Plant, development of new products, quality control, training, production planning, and transportation management of the products and raw materials.

## VI. Research and Consulting Areas

- Urban and industrial air quality management and air pollution control
- Air quality modeling, climate change, and policy making
- Indoor air quality
- Fate and transportation of pollutants
- Health and environmental risk assessment
- Biomass hydrothermal carbonization and air quality assessment

## VII. Scientific Publications

Carrasco Samuel; Gómez, Jaime; Vallejo, Fidel; **Díaz-Robles, Luis A.**; Pino-Cortes, Ernesto; Campos, Valeria; Cubillos, Francisco; Pelz, Stefan K; Paczkowski, Sebastian; Silva, Javier; Cereceda-Balic, Francisco; Vergara-Fernández, Alberto; Lapuerta, Magin; Pazo, Amparo; Monedero, Esperanza; Fu, Joshua S; Hoekman, S. Kent; and Figueroa, Juan; “Experimental Study on Hydrothermal Carbonization of Lignocellulosic Biomass with Magnesium Chloride”; Journal of Cleaner Production; Submitted, 2019.

Constanza Corvalán, **Luis A. Díaz-Robles\***, Francisco Cubillos, Fidel Vallejo, Jaime Gómez, Ernesto Pino-Cortés, Stefan K. Pelz, Sebastian Paczkowski, Samuel Carrasco, Javier Silva, Magín Lapuerta, Francisco Cereceda-Balic, Amparo Pozo, Esperanza Monedero, “Life cycle analysis of hydrothermal carbonization of urban organic solid waste and comparison with gasification process”; Journal of Cleaner Production; Submitted, 2019.

Alberto Vergara; Diana Yañez Sevilla; Paulina Morales; Felipe Scott; Germán Aroca; **Luis Díaz-Robles**; Patricio Moreno-Casas; “Biofiltration of benzo[a]pyrene, toluene and formaldehyde in air by a consortium of *Rhodococcus erythropolis* and *Fusarium solani*: effect of inlet loads, gas flow and temperature.” Chemical Engineering Journal, (ISI, Q1), Volume 332, 15 January 2018, Pages 702-710.  
<https://doi.org/10.1016/j.cej.2017.09.095>

Victoria Knappe, Sebastian Paczkowski, Julian Tejada, **Luis Alonso Diaz Robles**, Alain Gonzales, Stefan Pelz, “Low temperature microwave assisted hydrothermal

- carbonization (MAHC) reduces combustion emission precursors in short rotation coppice willow wood.”, *Journal of Analytical and Applied Pyrolysis*, IN PRESS, 2018.
- Francisco Cereceda-Balic; Mario Toledo; Victor Vidal; Fabián Guerrero; Julio Acuña; **Luis A. Díaz-Robles**; Magin Lapuerta, “Emission Factors for PM2.5, CO, CO2, NOx, SO2 and particle size distributions from the combustion of wood species using a new controlled combustion chamber 3CE”, *Science of the Total Environment*, Volumes 584–585, 15 April 2017, Pages 901–910, (ISI, Q1).
- Vergara-Fernández, A., **L. A. Díaz-Robles**, M. Sepúlveda, J. San Martín-Davison, and X. Petit-Breuilh. “Treatment of pulp mill wastewaters with *Fusarium solani* in a rotating biological contactor.” *Environmental Engineering and Management Journal*, 16 (2017), 10, 2275-2281.
- Valeria Campos, Ernesto Pino-Cortés, Alberto Vergara-Fernández, Francisco Cereceda-Balic, Pablo Ruiz, and **Luis A. Díaz-Robles**\*, “Health risk of cardio-respiratory morbidity and mortality due to PM2.5 exposure, and the relationship with socioeconomic structure types at the Santiago de Chile megacity.” *Environment International* (submitted), 2018.
- Francisco Cereceda-Balic; Mario Toledo; Victor Vidal; Fabián Guerrero; Julio Acuña; Luis A. Díaz-Robles; Magin Lapuerta, “Emission Factors for PM2.5, CO, CO2, NOx, SO2 and particle size distributions from the combustion of wood species using a new controlled combustion chamber 3CE”, *Science of the Total Environment*, Volumes 584–585, 15 April 2017, Pages 901–910
- Paulina Morales, Manuel Cáceres, Felipe Scott, **Luis Díaz-Robles**, Germán Aroca, and Alberto Vergara-Fernández, “Biodegradation of benzo[*a*]pyrene, toluene, and formaldehyde from the gas phase by a consortium of *Rhodococcus erythropolis* and *Fusarium solani*.” *Applied Microbiology and Biotechnology*, 2017, 101(17), 6765-6777.
- Cereceda-Balic, Francisco; Fadic, Ximena; Vidal, Víctor; and **Díaz-Robles, Luis**; “Application of a new methodology for determining Polycyclic Aromatic Hydrocarbons (PAHs) in atmospheric aerosols using different filter configurations, PUF and XAD-Denuder.” *Scientia Chromatographica*, Volume 8, Issue 3, p.189-195, 2016.
- Vergara-Fernández, A., Scott, F., Moreno-Casas, P.; **Díaz-Robles, L. A.**; Muñoz, R., “Elucidating the key role of the fungal mycelium on the biodegradation of hydrophobic VOCs”, *Chemosphere*, (2016), Volume 157, Pages 89–96.
- Luis Díaz-Robles**, Samuel Cortés, Alberto Vergara-Fernández, and Juan Carlos Ortega, “Short term health effects of particulate matter: A comparison between wood smoke and multi-source polluted urban areas in Chile.” *Aerosol and Air Quality Research*, Volume 15, No. 1, February 2015, Pages 306-318. (ISI, Q1).
- Karla Pozo, Victor H. Estellano, Tom Harner, **Luis Díaz-Robles**, Francisco Cereceda-Balic, Pablo Etcharren, Katerine Pozo, Fabian Guerrero, Alberto Vergara-Fernández, “Assessing Polycyclic Aromatic Hydrocarbons (PAHs) using passive air sampling in the atmosphere of one of the most wood-smoke-polluted cities in Chile: The case study of Temuco”, *Chemosphere*, Volume 134, September 2015, Pages 475–481.
- Vergara-Fernández, A., **L. A. Díaz-Robles**, M. Sepúlveda, J. San Martín-Davison, and X. Petit-Breuilh. “Treatment of pulp mill wastewaters with *Fusarium solani* in a

- rotating biological contactor.” *Environmental Engineering and Management Journal* (Accepted). 2015. (ISI, Q3)
- Pino-Cortés, Ernesto, **Díaz-Robles, Luis A.**, Cubillos, Francisco, Fu Joshu S., and Vergara-Fernández, Alberto, “Sensitivity Analysis of Biodiesel Blends on Benzo[a]pyrene and main Emissions using MOVES; A case study in Temuco, Chile.”, *Science of the Total Environment*, Volume 537, Pages 352–359, 2015, (ISI, Q1)
- Luis A. Díaz-Robles**, Joshua S. Fu, Alberto Vergara-Fernández, Pablo Etcharren, Luis N. Schiappacasse, Gregory D. Reed, and María P. Silva, “Health risks caused by short term exposure to ultrafine particles generated by residential wood combustion: a case study of Temuco, Chile.” *Environment International*, 66, May 2014, pages 174–181. (ISI, Q1)
- Vergara-Fernández, A., **L. A. Díaz-Robles**, J. San Martín-Davison, X. Petit-Breuilh. “Waste generated in the bioethanol production from hybrids poplar.” *Revista Mexicana de Ingeniería Química* (Submitted) RMIQ-121213-2. 2014. (ISI)
- Vergara-Fernández, A., **L. A. Díaz-Robles**, J. San Martín-Davison, O. Soto-Sánchez. “Effect of initial substrate/inoculum ratio on cell yield in the removal of hydrophobic VOCs in fungal biofilters.” *Revista Mexicana de Ingeniería Química* Vol. 13, No. 3 (2014) 749-755. (ISI)
- Nicolas Schiappacasse Poyanco, **Luis A. Díaz-Robles**, Francisco Cereceda-Balic, Paola Silva Schwartau Silva, “Health impacts in South-central Chile due to misuse of wood-burning stoves.” *Electronic Journal of Energy & Environment*, doi: 10.7770/ejee-V1N3-art685; 1(3), 2013. (LatinIndex)
- Díaz-Robles L.A.**, “Renewable Energy Systems and Air Multipollutants.” *Electronic Journal of Energy & Environment*, 1(3), 2013. (LatinIndex).
- Díaz-Robles L.A.**, Fu J.S., and Reed G.D., “Emission Scenarios and the Health Risks Posed by Priority Mobile Air Toxics in an Urban to Regional Area: An Application in Nashville, Tennessee.” *Aerosol and Air Quality Research* - 13, 3, 795-803, 2013 (ISI, Q1)
- Alejandro A Jerez, **Luis A Díaz-Robles**, Alberto Octavio Vergara-Fernández, “Generation and Dispersion Model of Gaseous Emissions from Sanitary Landfills.” *Electronic Journal of Energy & Environment*, doi: 10.7770/ejee-V0N0-art440; 1(1), 2013. (LatinIndex)
- Francisco Cereceda-Balic, Ximena Fadic, Ana L. Llanos, Ana María Domínguez, Juan L. Guevara, Víctor Vidal, **Luis A. Díaz-Robles**, L. Nicolás Schiappacasse, and Pablo Etcharren “Obtaining PAHs Concentration Ratios and Molecular Markers for Residential Wood Combustion: Temuco, a Case Study. *Journal of the Air & Waste Management Association*, 62(1): 44–51, 2012. (ISI, Q1)
- George M. Hidy, Critical Review Committee (**Luis Alonso Díaz-Robles**) “Energy supplies and future engines for land, sea, and air”, *Journal of the Air & Waste Management Association*, Volume 62, Issue 6, 2012. (ISI, Q1)
- Díaz-Robles L.A.**, Saavedra H, Schiappacasse L., and Cereceda-Balic F. “The air quality in Chile: twenty years of challenge.” *Environmental Management (EM)*, ISSN 1088-9981, Air & Waste Management Association, August 2011 (Scopus).
- George M. Hidy, Judith C. Chow, Mitchell Baer , **Luis Diaz-Robles**, L. Friedl, Peter Mueller Thomas Overcamp, and John Watson, “ Environmental Issues and Management Strategies for Waste Electronic and Electrical Equipment”, *Journal of*

- the Air & Waste Management Association, Volume 61, Issue 6, 586, 2011. (ISI, Q1)
- Judith C. Chow, Critical Review Committee (**Luis Alonso Díaz-Robles**), “Multipollutant Air Quality Management”, Journal of the Air & Waste Management Association, Volume 60, Issue 6, 2010. (ISI, Q1)
- Díaz-Robles L.A.**, Fu J.S., and Reed G.D., “Seasonal Distribution and Modeling of Diesel Particulate Matter in the Southeast US.”, Environment International, 35 (6), 956–964, 2009. (ISI, Q1)
- Sanhueza P.A., **Díaz-Robles L.A.**, Torreblanca M.A., Shiappacasse L.N., Silva M.P., and Astete T.D., “Particulate Air Pollution and Health Effects for Cardiovascular and Respiratory Causes in Temuco City, Chile; A Woodsmoke Polluted Urban Area.”, JAWMA, 59, (12) 1481-1488, 2009. (ISI, Q1)
- Raymond M. Hoffa and Sundar A. Christopher, Critical Review Committee (**Luis Alonso Díaz-Robles**), “Remote Sensing of Particulate Pollution from Space: Have We Reached the Promised Land?” Journal of the Air & Waste Management Association, Volume 59, Issue 6, 2009. (ISI, Q1)
- Díaz-Robles, L.A.**; Ortega-Bravo, J.C.; Fu, J.S.; Reed, G.D.; Chow, J.C.; Watson, J.G.; and Moncada, J.A. “A Hybrid ARIMA and Artificial Neural Networks Model to Forecast Particulate Matter in Urban Areas: The Case of Temuco, Chile.” Atmospheric Environment.42 (35) 8331-8340, 2008. (ISI, Q1)
- Díaz-Robles L.A.**, Fu J.S., and Reed G.D., “Modeling and Source Apportionment of Diesel Particulate Matter.”Environment International, 34 (1), 1-11, 2008. (ISI)
- Tonn B.E., Peretz J.H., Reed G.D., and **Díaz-Robles L.A.**, “Ozone Concentrations Around the Great Smoky Mountains”, Futures Research Quarterly, 21:3:56 (2005). (ISI)
- Peretz J.H., Tonn B.E., Garnmeister S., Reed G.D., **Díaz-Robles L.A.** “Using Scenarios to Assess the Impact of Air Pollution in the Great Smoky Mountains National Park,” Public Works Management & Policy, 2005 10: 170-185. (ISI)

### VIII. Conferences and Congress Proceedings

- 2018 Ernesto Pino-Cortes, **Luis Diaz-Robles**, “Simulation of the Meteorological Variables in a Hemispheric Domain on Antarctica”, Paper #411094, AWMA’s 111th Annual Conference & Exhibition, 2018, Hartford, Connecticut, U.S.
- 2018 Ernesto Pino-Cortes, Mariana Escamilla, **Luis Diaz-Robles**, “HTC Treatment of Urban Solid Waste, the Case of Region Metropolitana, Chile”, Paper # 410694, AWMA’s 111th Annual Conference & Exhibition, 2018, Hartford, Connecticut, U.S.
- 2018 Ernesto Pino-Cortés, **Luis Díaz-Robles**, “Emission inventory of atmospheric pollutants and black carbon from anthropogenic sources for the Southern Hemisphere.” 3º Inter-American Congress on Climate Change. Resilience to climate change in Latin America. AIDIS Interamericana- Argentina. 8-10 Mayo, 2018, Buenos Aires. Argentina.
- 2016 Ernesto Pino-Cortés, **Luis Díaz Robles**, Alberto Vergara, “Quantification of emission sources contributing to the concentration of PM2.5 in Temuco, Chile,

- using receptor model.”, 15<sup>th</sup> Annual Community Modeling and Analysis System (CMAS) Conference, October 24-26, 2016, Chapel Hill, North Carolina, US.
- 2016 Yáñez, D.; Aroca, G; **Díaz-Robles, L**; Vergara-Fernández, A. “Biofiltration of a toluene, formaldehyde, and benzo[a]pyrene gas stream blend using a bacteria/fungus consortium”, XIX Congress of Chemical Engineer, UTFSM, Santiago, November 2016.
- 2014 **Luis Díaz-Robles**, Alberto Vergara-Fernández, Norman Vergaray, Roberto Aldunate, “Mesoscale meteorology modeling and sensitivity analysis for the south of Chile region using WRF-ARW model”, 13<sup>th</sup> Annual Community Modeling and Analysis System (CMAS) Conference, October 27-29, 2014, Chapel Hill, North Carolina, US.
- 2014 **Luis Díaz-Robles**, Ernesto Pino-Cortés, Alberto Vergara-Fernández, Francisco-Cereceda-Balic, “The Effect of Switching Mobile Sources to different Biodiesel Blends on Benzo(a)pyrene and PM<sub>2.5</sub> and the main Emissions at Urban Areas using the adapted MOVES model; the Case of Temuco, Chile.”, 13<sup>th</sup> Annual Community Modeling and Analysis System (CMAS) Conference, October 27-29, 2014, Chapel Hill, North Carolina, US.
- 2013 Karla Pozo, German Oyola, **Luis Díaz-Robles**, Anny Rudolph, Victor H. Estellano, Ramon Ahumada R., Pablo Etcharen, Petr Kukucka, Petra Pribylova, Marielle Mulder, Christos Efstathiou, Julieth Banghera, Victoria Gomez, Katherine Pozo, Camila Pacheco, Patricio Jara, and Raul Morales, “Air concentrations of Semivolatile Organic Compounds (SVOCs) in three cities of Chile, Santiago, Concepción and Temuco, using PUF disk as passive samplers.” International Workshop on Air Quality Forecasting and Research, October 8-10, Santiago, Chile.
- 2013 Francisco Cereceda, Fabian Guerrero, Victor Vidal, Flavio Cubillos, and **Luis Díaz-Robles**, “Emission Factors for PM<sub>2.5</sub> generated from the combustion of *Eucalyptus globulus* and *Obliqua Nothofagus* on ideal conditions using a controlled combustion chamber 3CE.”, Extended Abstract 2013- 59796-AWMA, Proceedings of the A&WMA’s 106<sup>th</sup> Annual Conference & Exhibition 2013, Chicago, USA 2013.
- 2013 **Luis Díaz-Robles**, Catalina Gaete, Cristian Varela, “Source apportionment of ultrafine particles in Temuco, Chile, using chemical mass balance receptor modeling and MOUDI sampling.”, Extended Abstract 2013- 12908-AWMA, Proceedings of the A&WMA’s 106<sup>th</sup> Annual Conference & Exhibition 2013, Chicago, USA 2013.
- 2013 **Luis Díaz-Robles**, Ximena Petit-Breuilh, Nicolás Schiappacasse, Francisco Cereceda, Sergio Dávila, Cristian Varela, Claudia Lagos, “Physic-chemical characterization of the 10 most used trees in Chile for residential wood combustion, its relationship with the emission factors.”, Extended Abstract 2013- 12902-AWMA, Proceedings of the A&WMA’s 106<sup>th</sup> Annual Conference & Exhibition 2013, Chicago, USA 2013.
- 2012 **Luis Díaz-Robles**, Herman Saavedra, Luis Schiappacasse, and Cereceda-Balic F., “**The air quality in Chile: twenty years of challenge**” Extended Abstract 2012- 546-AWMA, Proceedings of the A&WMA’s 105<sup>th</sup> Annual Conference & Exhibition 2012, San Antonio, Texas, USA 2012.
- 2012 **Luis A. Díaz-Robles**, María P. Silva, Ximena Petit-Breuilh, Luis Schiappacasse, Sergio Dávila, Cristian Varela, and Pablo Etcharren, “**Morbidity short term effects due to fine and ultrafine particulate matter in Temuco, Chile, a Residential**



- Wood Combustion Problem**” Extended Abstract 2012-570-AWMA, Proceedings of the A&WMA’s 105<sup>th</sup> Annual Conference & Exhibition 2012, San Antonio, Texas, USA 2012.
- 2011 **L. A. Díaz-Robles**, N. Schiappacasse, S. Cortés, J. Ortega, Air Quality Unit, Renewable Energies and Environmental Quality Centre, College of Engineering, Catholic University of Temuco, Chile, M. P. Silva, Universidad Mayor, Chile, F. Cereceda-Balic, V. Vidal, X. Fadic, Centro de Tecnologías Ambientales (CETAM), Universidad Técnica Federico Santa María, Chile, “Mortality short term effects due to particulate matter in Chile, re analysis using gam.exact”, Extended Abstract 2011-A-729-AWMA, Proceedings of the A&WMA’s 104th Annual Conference & Exhibition 2011, Orlando, Florida. 2011
- 2011 **L. A. Díaz-Robles**, N. Schiappacasse, J. Ortega, Air Quality Unit, Renewable Energies and Environmental Quality Centre, College of Engineering, Catholic University of Temuco, Chile, F. Cereceda-Balic, Centro de Tecnologías Ambientales (CETAM), Universidad Técnica Federico Santa María, Chile, “The involution of the air quality in Temuco city, Chile, a fine particulate matter challenge”, Extended Abstract 2011-A-488-AWMA, Proceedings of the A&WMA’s 104th Annual Conference & Exhibition 2011, Orlando, Florida. 2011.
- 2011 F. Cereceda-Balic, X. Fadic, J.L. Guevara, V. Vidal, A. M. Domínguez, A.L. Llanos, Laboratorio de Química Ambiental, Centro de Tecnologías Ambientales (CETAM), Universidad Técnica Federico Santa María. **L.A. Díaz-Robles**, L.N. Schiappacasse, Air Quality Unit, School of Environmental Engineering, Catholic University of Temuco. P. Etcharren, R. Toro, Secretaría Regional Ministerial de Medio Ambiente (SEREMI) Región de La Araucanía, “Characterization of PAHs in urban organic aerosol of air pollution episodes in Temuco”, Extended Abstract 2011-A-669-AWMA, Proceedings of the A&WMA’s 104th Annual Conference & Exhibition 2011, Orlando, Florida. 2011.
- 2011 Francisco Cereceda-Balic, José L. Cayón, Juan L. Guevara, Ximena Fadic, Víctor Vidal, Environmental Chemical Laboratory, Environmental Technology Centre (CETAM), Technical University Federico Santa María, **L.A. Díaz-Robles**, C. Valdés Barra, Air Quality Unit, School of Environmental Engineering, Catholic University of Temuco, Chile, Ricardo Barra, Universidad de Concepción, Chile, and Lorenzo Caballero, Ministerio del Medio Ambiente, Chile, “Feasibility Study for the Establishment of a Network of Laboratories for the Analysis of Persistent Organic Pollutants (POPs) in Chile”, Extended Abstract 2011-A-663-AWMA, Proceedings of the A&WMA’s 104th Annual Conference & Exhibition 2011, Orlando, Florida, 2011.
- 2010 **Luis A. Díaz-Robles**, Juan Moncada-Herrera, Nicolás Schiappacasse P., Pablo Etcharren, Francisco Cereceda-Balic, Robert Flocchini, Paul Wakabayashi, Nathalie Araneda, Ingrid Pérez, “Source Apportionment of PM<sub>2.5</sub> in Temuco, Chile, Using Factor Analysis and IMPROVE Sampling. A Seasonal Analysis.” Extended Abstract 250, A&WMA International Specialty Conference: Leapfrogging Opportunities for Air Quality Improvement, Xi’an, China, 2010.
- 2010 **Luis A. Díaz-Robles**, Eddio Carimán, Pablo Etcharren, Francisco Cereceda-Balic, Cristian Varela-Bruce, “Modeling the Biogenic Emissions using WRF/MCIP/MEGAN in Chile; a Comparison among three Urban Areas.” Extended

- Abstract 252, A&WMA International Specialty Conference: Leapfrogging Opportunities for Air Quality Improvement, Xi'an, China, 2010.
- 2010 Francisco Cereceda-Balic, Víctor Vidal C, Juan L. Guevara, **Luis A. Díaz-Robles** et al., "Speciation of Volatile Organic Compounds (VOCs) in the Atmosphere of O'Higgins's Region-Chile." A&WMA International Specialty Conference: Leapfrogging Opportunities for Air Quality Improvement, Xi'an, China, 2010.
- 2010 Francisco Cereceda-Balic, Nicolás Schiappacasse, Víctor Vidal, **Luis A. Díaz-Robles** et al., "Atmospheric PAHs Determination: Influence of the Air Sampling Time Program in the Occurrence of Artifacts." A&WMA International Specialty Conference: Leapfrogging Opportunities for Air Quality Improvement, Xi'an, China, 2010.
- 2010 **Luis A. Díaz-Robles**, Nathalie Araneda, Ingrid Pérez, Joshua S. Fu, and Nicolás Schiappacasse, "Polycyclic Aromatic Hydrocarbons (PAHs) Changes Posed by Residential Wood Combustion Scenarios on an Urban Area; an Application in Temuco, Chile." School of Environmental Engineering, College of Engineering, Catholic University of Temuco, Temuco, Chile, Extended Abstract 2010-A-1191-AWMA, Proceedings of the A&WMA's 103th Annual Conference & Exhibition 2010, Calgary, Canada. 2010.
- 2010 **Luis A. Díaz-Robles**, Juan C. Ortega, María Paola Silva, and Marcela Guerrero, Particulate Air Pollution and Health Effects for Cardiovascular and Respiratory Causes over an Industrial Neighborhood; Linking Epidemiological Time Series Studies and the Power of a Health Perception Survey." Extended Abstract 2010-A-1411-AWMA, Proceedings of the A&WMA's 103th Annual Conference & Exhibition 2010, Calgary, Canada. 2010.
- 2009 Eddio Carimán Linares, **Luis A. Díaz-Robles**, Cristian Varela-Bruce, and Pablo Etcharren Ulloa, "Modeling of the Biogenic Emissions using WRF/MCIP/MEGAN in the South of Chile", School of Environmental Engineering, College of Engineering, Catholic University of Temuco, Temuco, Chile, 8th Annual CMAS Models-3 User's Conference, October 19-21, 2009 Chapel Hill, NC, <http://www.cmascenter.org/conference/2009/agenda.cfm>
- 2009 **Díaz-Robles L.A.**, Etcharren P., Moncada-Herrera J., Araneda N., Pérez I., Flocchini R., Wakabayashi P., Schiappacasse L.N, and Cereceda-Balic F., "Source Apportionment of High Episodes of PM<sub>2.5</sub> in Temuco, Chile, Using Factor Analysis and IMPROVE Sampling.", Extended Abstract 2009-A-641-AWMA, Proceedings of the A&WMA's 102th Annual Conference & Exhibition 2009, Detroit, Michigan, US.
- 2009 Cereceda-Balic F., Fadic X., Llanos A., Vidal V., Schiappacasse L.N, **Díaz-Robles L.A.**, and Etcharren P. "Application of a new methodology for determining Polycyclic Aromatic Hydrocarbons (PAHs) in atmospheric aerosols using different filter configurations, PUF and XAD-Denuder.", Extended Abstract 2009-A-623-AWMA, Proceedings of the A&WMA's 102th Annual Conference & Exhibition 2009, Detroit, Michigan, US.
- 2009 Cereceda-Balic F., Fadic X., Llanos A., Vidal V., Schiappacasse L.N, **Díaz-Robles L.A.**, and Etcharren P. "Obtaining PAH Concentration Ratios and Molecular Markers for Residential Wood Combustion: Temuco, a Case Study.", Extended Abstract 2009-A-600-AWMA, Proceedings of the A&WMA's 102th Annual Conference & Exhibition 2009, Detroit, Michigan, US.

- 2008 Sanhueza P., **Díaz-Robles L.A.**, "Particulate Air Pollution and Health Effects for Cardiovascular and Respiratory Causes in Temuco City, Chile." Paper # EE-1a-186-AWMA, Proceedings of the A&WMA's 101th Annual Conference & Exhibition 2008, Portland, Oregon, US.
- 2007 **Díaz-Robles L.A.**, Ortega-Bravo J.C. "A Hybrid ARIMA and Artificial Neural Networks Model to Forecast Particulate Matter in Urban Areas: The Case of Temuco, Chile." Paper # AB-1a (1)-522-AWMA, Proceedings of the A&WMA's 100th Annual Conference & Exhibition 2007, Pittsburgh, Pennsylvania, US, 2007.
- 2006 **Díaz-Robles L.A.**, Fu J.S., and Reed G.D., "Health Risk Assessment Posed by Primary Diesel Particulate Matter and Vapor Air Toxics in Southeastern US", Paper # EE-1c (2)-417-AWMA, Proceedings of the A&WMA's 99th Annual Conference & Exhibition 2006, New Orleans, Louisiana, US, 2006.
- 2006 **Díaz-Robles L.A.**, Fu J.S., and Reed G.D., "Seasonal Distribution and Modeling of Diesel Particulate Matter in the Southeast US", Paper # AB-1a (2)-491-AWMA, Proceedings of the A&WMA's 99th Annual Conference & Exhibition 2006, New Orleans, Louisiana, US.
- 2005 **Díaz-Robles L.A.**, Reed G. D., and Fu J. S., University of Tennessee. "Diesel Particulate Matter Modeling and Inhalation Cancer Risk in Nashville, Tennessee, using Models-3/CMAQ." Poster presentation at the 4th Annual CMAS Models-3 User's Conference. UNC-Chapel Hill, 26-28 September 2005.  
<http://www.cmascenter.org/conference/2005/archive.cfm>
- 2005 **Díaz-Robles L.A.**, Reed G. D., and Fu J. S., University of Tennessee. "Source Apportionment of Diesel Particulate Matter in the Southeastern United States Using Models3-CMAQ." Proceedings of the 14th International Emissions Inventory Conference, Session 5. Las Vegas, Nevada, 2005.  
<http://www.epa.gov/ttnchie1/conference/ei14/>
- 2005 Vllasi E, **Díaz-Robles L.A.**, Yun J, University of Tennessee. "A Methodology to Validate the 2002 Air Toxics Inventory for Tennessee." Proceedings of the 14th International Emissions Inventory Conference, Session 10. Las Vegas, Nevada, 2005. <http://www.epa.gov/ttnchie1/conference/ei14/>
- 2004 **Díaz-Robles L. A.**, Greene D.S, Doraiswamy P., Reed G. D., and Fu J. S., University of Tennessee. "The Effect of Switching Mobile Sources to Natural Gas on the Ozone in the Great Smoky Mountains National Park." Proceedings of the A&WMA 97th Annual Conference & Exhibition 2004. Session: ET-1b: Cost and Emission Control Effectiveness of Transportation Control Measures, Indianapolis, Indiana, 2004.

## IX. Research and Consulting GRANTS

Period	Fund, institution, name of the study, budget, responsibility
2018-2020	FONDEF IDeA (Fund for the Promotion of Scientific and Technological Development) project ID15i10182, "Research and optimization of the production of pellets of high energy density through the hydrothermal carbonization of different mixtures of industrial organic sludge and urban

- organic solid waste, and its subsequent gasification to generate heat energy”  
Director.
- 2018-2020 FONDEF IDeA (Fund for the Promotion of Scientific and Technological Development) project ID15i10152, Energetic Valorization of Solid Waste of the Cellulose Industry to make HTC Pellets, Co-investigator.
- 2018 PM10 particulate matter forecast of the construction phase of the SGO Spence Mining project, BHP-Billiton. EYE3 SpA.
- 2018 Performance evaluation of the air quality forecast model for PM10, based on WRF-Chem, plotter CO, between the Metropolitan regions of Santiago and Los Lagos, Ministry of the Environment, Chile.
- 2018 Study to determine the location of the air quality monitoring fixed stations in the provinces of Peru. Photochemical Modeling-CMAQ, Agency for Evaluation and Environmental Enforcement (OEFA). Algorithms and Environmental Measurements S.P.A.
- 2018 Meteorological Modeling with WRF3.9 for Coal Power Plant environmental permitting, Jaime Illanes & Asociados.
- 2018 BHP Billiton Minera Escondida, air quality study and analysis - MEL emissions inventory update. Chile.
- 2017 Theoretical estimation of the contributions of SO<sub>2</sub>, NO<sub>x</sub> and VOC emissions to the formation of secondary MP2.5 from the Oil Refinery, ENAP, Concón. Chile.
- 2017-2018 Strategic consultant for the air quality area of the ABRA’s Environmental Impact Assessment of its concentrator plant, Golder Associates. Chile.
- 2016-2018 CONICYT-BMBF-150067 “Premium wood pellets based on different lignocellulosic biomass by an innovative fuel design and HTC treatment – sustainable contribution to a clean heat supply in Chile and Germany”. \$US 230,000. Director.
- 2017 MYMA Ltda. “Air Quality Modeling of PM10 and PM2.5 for El Toqui Mineral Company.” Director.
- 2017 Algoritmos y Mediciones Ambientales SPA, “WRF-ARW.” Training and Consulting.
- 2016 Cooper Mining Project, “Air Quality Modeling WRF-CALPUFF of the Los Pelambres area”. Training and Consulting.
- 2016 ARCADIS S.A., “Photochemical Air Quality modeling and Environmental Assessment due to a Coal Burning Power Plat and other Industrial Projects to be built at Mejillones County and Surrounding Areas”. \$US 12,000.
- 2016 CETAM UTFSM, “Air quality statistical analysis of the ENAP’s monitoring network”. \$US 10,000.
- 2016-2017 FONDEF IDeA (Fund for the Promotion of Scientific and Technological Development) project ID15I10580, “Research and optimization of pellet hydrophobic high energy density production through the hydrothermal carbonization of different biomass blends of national importance”. \$US 230,000. Director.
- 2015-2017 UAM-SANTANDER interuniversity cooperation project, “Organic solid waste recovery by anaerobic digestion and hydrothermal carbonization”. Co-Investigator.

- 2015 Chilean Ministry of Environment, Valparaiso region, "Air quality statistical analysis of the monitoring networks in the Valparaiso region". \$US 22,000.
- 2015 WRF-ARW meteorological modeling of the Central Chilean Valley for ANAM S.A.
- 2015-2017 Grant to support the development of international research projects, DPI20140093, "Impact of Wood Burning Air Pollution on Preeclampsia and other Pregnancy Outcomes in Temuco". Co-Investigator
- 2015-2016 FONDEF IDeA ID14110130. Indoor Air Bio-Purification: better health, welfare, and productivity. \$US 230,000. Investigator.
- 2014-2015 Sulfur dioxide dispersion modeling for the new facility of Quimetal Industrial S.A. \$US 10,000. Director
- 2014-2015 Chilean Ministry of Environment, "Development of an informatics and integral database to manage and declare the greenhouse gases of Chile to the OCDE and Union Nations" \$US 24,000.
- 2014-2015 Chilean Ministry of Environment, Biobío Region, "Study of pollutants characterization by different residential wood combustion systems on Biobío region". US\$ 70,000. Director
- 2014-2015 Chilean Ministry of Environment, O'Higgins Region, "Study of point source contribution to PM2.5 in the region of O'Higgins". US\$ 36,000. Director
- 2014-2014 Chilean Ministry of Environment, RM, "Technical and Economic Study of District Heating in Temuco and Chillán urban areas". US\$ 85,000. Co-Investigator
- 2013-2013 Implementation of wood stove catalytic converters at Temuco urban area, Municipality of Temuco Project. US\$ 271,000. Director
- 2011-2014 FONDECYT 1120791 Project, "Implementation of a robust physical chemical mechanism for polycyclic aromatic hydrocarbons into the state-of-the-science deterministic Community Multiscale Air Quality Modeling System (CMAQ) and its application to simulating Benzo (a) pyrene", US\$ 240,000, Director.
- 2011-2014 FONDEF (Fund for the Promotion of Scientific and Technological Development) project "Analysis and Generation of Data Base of Energy Potential and Air Pollutant Emissions of Biofuels of National Importance", US\$ 830,000, Investigator.
- 2012-2013 Chilean Ministry of Environment, Los Lagos Region, "Consumption and characterization of the use of firewood in the city of Osorno, Chile." \$US 26,000. Director
- 2010-2013 FONDEF (Fund for the Promotion of Scientific and Technological Development) project "Research and generation of air pollutant emission factors for residential wood combustion of national importance." US\$ 730,000, Director. This was selected by CONICYT as "**The 10 scientific achievements of 2013**"  
<http://www.latercera.com/noticia/tendencias/2013/12/659-558381-9-los-10-hitos-cientificos-de-2013.shtml>
- 2009-2011 FONIS (Health Research Funding) project, "Ultrafine particulate matter pollution, mortality, and morbidity at Temuco; susceptibility among the elderly and children." US\$ 38,000, Director.

2009-2012 FONDEF (Fund for the Promotion of Scientific and Technological Development) project, "Research and Development of a Technological Packet to Produce Cellulosic Ethanol from Hybrid Poplars in Chile." US\$ 546,000, Vice-Director

2009-2012 INNOVA-CORFO, "Technologies Development for firewood burning, cleaner and more efficient for domiciliary use." US\$ 460,000, Vice-Director

2010 CONAMA (Chilean EPA) Araucania Project, "Health risk assessment due to fine particulate matter exposure in Temuco and Padre Las Casas; morbidity and mortality time series study". US \$ 25,000, Director

2009 CONAMA Los Lagos Project, "Determination of the saturated zone of particulate matter in Osorno" US\$ 10,000, Director

2009 CONAMA Araucania Project, "Emissions scenarios analysis using WRF/SMOKE/CMAQ at Temuco, a non-attainment area for particulate matter" US\$ 30,000, Director

2009 CONAMA Valparaiso Project, "General Analysis and Proposal for the Atmospheric Decontamination Plan of Ventanas." US\$ 34,000, Co-Investigator

2008 CONAMA O'Higgins Project, "Diagnostic study of the VOCs inventory and photochemical campaign at Rancagua city." US\$ 104,000, Vice-Director

2008 CONAMA Bio-Bio Project, "Emissions Inventory Development for Metropolitan Concepcion, Chile." US\$ 32,000, Principal Investigator (PI)

2008 CONAMA Bio-Bio Project, "Emissions Inventory Development for Chillan and Los Angeles Urban Areas, Chile." US\$ 62,000, Principal Investigator (PI)

2008 CONAMA Bio-Bio Project, "Short term effects analysis due to atmospheric pollution over mortality and morbidity by respiratory and cardiovascular diseases in the Concepcion and Talcahuano area, Chile." US\$ 32,000, PI

2008-2010 FNDP-CONAMA Araucanía, Catholic University of Temuco, "Emissions Measurement from Wood Devices.", which includes to build and implement an emissions laboratory with EPA's standard methods to measure emissions, and estimate emission factors for the main wood devices used in the south of Chile to heating or cooking. UCT-FNDR 30040008-0, US\$ 66,000, PI

2008-2009 "Mega Monitoring of Temuco's Air Quality" International Collaboration with the University of California, Davis, University of Siena, Italy, Universidad Técnica Federico Santa María, Chile, CONAMA Araucanía, and Catholic University of Temuco, Principal Investigator (PI).

2007-2009 DIUCT, Research Direction, Catholic University of Temuco, "Chemical dispersion, fate, and transport of pollutants over air and soil resources based on the high performance Cluster Beowulf architecture as tool to solve complex problems of scientific calculus." DIUCT number 2006-2-03, US\$ 30,000, PI.

2006-2007 FNDP-CONAMA Araucanía, University of Santiago of Chile, Catholic University of Temuco, "Short term effects analysis due to particulate matter atmospheric pollution over mortality and morbidity by respiratory and cardiovascular diseases in Temuco, Chile." US\$ 24,000, Co-PI.

2007-2008 CONAMA Maule, Catholic University of Temuco, "Environmental impact assessment generated by the presence of pollutants in the Mataquito River

2004-2005	and Design of an Environmental Restoration and Recovering Plan.” Water Quality Modeling, US\$ 312,000. Co-PI Waste Management Research and Educational Institute, University of Tennessee, “Source apportionment of diesel particulate matter in the southeastern United States using advanced air quality modeling.” Graduate Student Investigator.
2003-2005	Waste Management Research and Educational Institute, University of Tennessee, “Air Toxic Pollutants Control to Reduce Health Risks in Tennessee.” US\$73,010, Graduate Student Investigator.
2002-2004	U.S. Environmental Protection Agency (EPA), University of Tennessee, “Air Quality Initiative for the Great Smoky Mountains National Park.” US\$750,000. Graduate Student Investigator.
2002-2003	FNDR Regional, Catholic University of Temuco, “Comprehensive Emission Inventory Development of Persistent Organic Pollutants in the Araucania Region, Chile.” PI
1993-1996	Unilever Chile S.A., COPRONA S.A., Production Department, Optimization of the Grape Seed Oil Production, PI.
1993-1996	Unilever Chile S.A., COPRONA S.A., Production Department, Optimization of the Oil Winterization Process, PI.

## X. Teaching

Period	Institution, <b>graduate program</b> , course
2014-to date	Universidad de Santiago de Chile, Ph.D. Program of Chemical Engineering. Air Quality Management and Air Pollution Control Advanced Chemical Kinetics
2016-to date	Universidad de Santiago de Chile, Master of Environmental Engineering. Hazardous waste management and control Advanced Air Quality Modeling
2007-to 2013	Catholic University of Temuco, Master of Environmental Engineering Air Quality Management and Air Pollution Control Air Quality Modeling, Applied Time Series Environmental Risk Assessment
2006-to 2013	Catholic University of Temuco, Master of Territorial Planning Research and Applied Multivariate Statistics.
Period	Institution, <b>undergraduate program</b> , course, period
2014-to date	Universidad de Santiago de Chile, Chemical Engineering. Heterogeneous Chemical Reactions Air Quality Management and Air Pollution Control
1998-2013	Catholic University of Temuco, under graduate programs of Environmental Engineering, Chemical Engineering, and Industrial Engineering: Air quality management and air pollution control (2006-2013)

Air quality modeling (2006-2008)  
 Pollutant Fate Modeling & Environment Risk Assessment (2006-2008)  
 Solid waste management (2006-to 2013)  
 Waste water treatment (1999-2001)  
 Transport phenomena (1998-2001)  
 Heat transfer (1998-2001, 2013)  
 Dynamic simulation and process control (1998-2001)

## XI. Thesis advising

Year	Student, (program), institution, title, status, responsibility
2018	Samuel Cortés, ( <b>Doctoral Thesis of Engineering Sciences Graduate Program. Mention Process Engineering</b> ), University of Santiago, Research and optimization of pellet hydrophobic high energy density production through the hydrothermal carbonization of different biomass blends of national importance. Advisor
2018	Ernesto Pino, ( <b>Doctoral Thesis of Engineering Sciences Graduate Program. Mention Process Engineering</b> ), University of Santiago, Modeling of the black carbon deposition and the Chilean Antarctic Peninsula, the effect of biomass burning in the Southern Hemisphere.
2016	Daniela Santibáñez, ( <b>Thesis of the Environment and Land Management Master Program</b> ), University of Santiago, “Particulate matter modeling of a copper tailing using WRF-CALPUFF”. Advisor
2016	Vicky Ortiz, ( <b>Thesis of the Environment and Land Management Master Program</b> ), University of Santiago, “Aplicación del modelo de dispersión de contaminantes utilizando Calpuff, para determinar el aporte de MP10 asociado al crecimiento del muro del tranque de relaves Ovejería, Codelco División Andina.” Advisor
2016	Fidel Vallejos, ( <b>Thesis of Engineering Sciences Master Program</b> ), University of Santiago, “Modelado y simulación de un biofiltro para purificación de aire de interiores.”
2016	Daniel Sánchez, ( <b>Thesis of Engineering Sciences Master Program</b> ), University of Santiago, “Estudio del proceso de secado de biomasa carbonizada en un secador rotatorio indirecto discontinuo, para la óptima producción de pellets hidrofóbicos de alta densidad energética”.
2016	Daniela Arias del Mauro, ( <b>Thesis of Environmental Engineering Master Program</b> ), University of Santiago, “Modeling of dry and wet deposition of black carbon on glaciers in central Chile. An Eulerian modeling using.” WRF/SMOKE/CMAQ system”
2016	Diana Yáñez, ( <b>Thesis of Engineering Sciences Master Program</b> ), University of Santiago, “Estudio de los principales aspectos operacionales de un sistema de biofiltración para su aplicación en el tratamiento de aire de interiores”



- 2016 Jennyfer Calderón, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Evaluation of the cost/benefit impact of using catalytic heaters that burn biomass in the saturated zones of southern Chile. An application with the WRF/CMAQ/BENMAP” Advisor
- 2016 Felipe Carreño, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Modelación y simulación fluido dinámica de un reactor batch para carbonización hidrotérmica de biomasa.”
- 2016 David Docmac, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Evaluation of the cost / benefit impact of district heating with biomass in the saturated zones of southern Chile. An application with the WRF/CMAQ/BENMAP”. Advisor
- 2016 Eduardo Santelices, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Assessment of using hydrophobic and high energy density pellets on air quality and urban health. A case study in the city of Temuco”. Advisor
- 2016 Fernanda Iñiguez, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Evaluation of the cost / benefit impact of using hydrophobic and high energy density pellets on point sources. An application with the WRF/CMAQ/BENMAP models for the city of Temuco”. Advisor
- 2016 Francisco Chávez, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago of Chile, “Modeling the fugitive particulate matter (PM2.5) using Lagrangian stochastic model CALPUFF; A case study in the Antofagasta harbor.” Advisor
- 2016 Beatriz Ulloa, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Annoying odors forecasting in the agriculture-industrial sector using the WRF/CALMET/CALPUFF platform.” Advisor
- 2015 Valeria Campos, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Evaluating the health effects of the new Santiago’s PM2.5 Atmospheric Decontamination Plan of Santiago using WRF-CMAQ-BENMAP”. Advisor
- 2015 Pedro Cruz, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Determination of partition coefficient and surface hydrophobicity in the mass transfer of VOCs and PAHs on biomass.” Advisor
- 2014 Yerko Aguilera Carvajal, (**Doctoral Thesis of Engineering Sciences Graduate Program. Mention Process Engineering**), University of Santiago, Computational fluid dynamics modeling of gas conditioning system in Pierce Smith converters and coupling effects of additional converter, smelting Caletones, Co-Advisor.
- 2014 Ignacio Soto, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Health risk assessment for chronic exposure to atmospheric Mercury emitted at the Industrial area of Ventanas, Puchuncaví. An Eulerian modeling using WRF/SMOKE/CMAQ system”. Advisor
- 2014 Nicolás Bianchi, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Fluid dynamics simulation of fine particles formation in a dilution tunnel used for aerosol sampling of residential wood combustion”.

## Advisor

- 2014 Guillermo Vega, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Benzo(a)pyrene modeling at the Araucanía Region using CMAQ model.”. Advisor
- 2014 Gino Olivares, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Impact of the emission reductions between 2009 and 2030, over Benzo(a)pyrene concentrations in the Temuco and Padre Las Casas counties.”. Advisor
- 2014 Antonia Latapiat, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Fluid dynamics simulation of residential wood combustion, formation of polycyclic aromatic hydrocarbons.”. Advisor
- 2014 Marcela Astudillo, (Bachelor Thesis of Civil Chemical Engineering), University of Santiago, “Health risk assessment for chronic exposure to Benzo(a)pyrene from residential wood combustion over an urban to regional area. An Eulerian modeling using WRF/SMOKE/CMAQ system”. Advisor
- 2014 Alfredo Maldonado, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Mortality and morbidity short term effects due to particulate matter in Osorno and Valdivia, an analysis using gam.exact.” Finished, Advisor
- 2013 Pablo Donoso, (**Doctoral Thesis of Engineering Sciences Graduate Program. Mention Process Engineering**), University of Santiago, “Study of the phenomenon of thermo electricity by combustion in porous media under turbulent fluid dynamic regime recuperative burner.”, Co-Advisor
- 2013 Ernesto Pino, (**Magister Thesis of Chemical Engineering**), University of Santiago, “Modeling and simulation of mobile source emissions in Temuco and Padre Las Casas counties using MOVE model.” Finished. Advisor.
- 2013 Cristian Figueroa, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Source Apportionment of PAHs in Temuco, Chile, Using Receptor Modeling and High-Volume PM2.5 and PUF Sampling.” Finished. Advisor
- 2013 Camilo Morales, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Modeling and simulation of area source emissions in Temuco and Padre Las Casas counties using SMOKE model.” Advisor
- 2013 Beyssi Jofré, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Modeling and simulation of point source emissions in Temuco and Padre Las Casas counties using SMOKE model.” Finished. Advisor
- 2013 Jorge Bachler, (**Magister Thesis of Territorial Planning**), Catholic University of Temuco, “Analysis of the perception of air pollution on vulnerable populations located in industrial centers of the Great Conception as input for decision-making in land use planning.” Finished, Advisor.
- 2013 Catalina Gaete, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Source Apportionment of ultra-fine particles in Temuco, Chile, Using Receptor Modeling and MOUDI Sampling.” Finished,

Advisor.

- 2012 Pablo Etcharren, (**Magister Thesis of Engineering Science**), Catholic University of Temuco, "Ultrafine particulate matter pollution, mortality, and morbidity at Temuco; susceptibility among the elderly and children." Finished, Advisor.
- 2012 Guisselle Soto, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Source Apportionment of PM<sub>2.5</sub> in Temuco, Chile, Using PMF and UNMIX models and IMPROVE Sampling." Working, Advisor
- 2012 Gabriel Artigas, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Tropospheric ozone effects on the use of different blends of biofuels in vehicle sources, a photochemical modeling in the O'Higgins Region." Working, Advisor
- 2012 Delia Franco Espinoza, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco. "Installation and startup of a Suitcase Dilution Tunnel for measuring emission factors from wood stove devices." Finished, Advisor
- 2011 Daniela Peña, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Modeling of SO<sub>2</sub> and proposed relocation of the monitoring network using the Lagrangian model CALPUFF, the case of Puchincaví-Ventanas nonattainment zone." Finished, Advisor
- 2010 Samuel Cortés, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Mortality and morbidity short term effects due to particulate matter in Chile, re analysis using gam.exact." Finished, Advisor
- 2010 Cristian Varela, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Health Risk Assessment due to SO<sub>2</sub> exposure using CMAQ Air Quality Modeling: the Case of Puchuncaví-Ventanas." Finished, Advisor.
- 2010 Miguel Morales, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Design and fluid dynamic simulation of a dilution tunnel to sample VOCs and particulate matter from combustion processes; a FLUENT software application." Finished, Advisor
- 2010 Ingrid Pérez, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Health risk assessment due to PAHs exposure at Temuco; a Models-3/CMAQ simulation." Finished, Advisor
- 2010 Nathelie Araneda, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Emissions scenarios analysis to reduce PAHs at Temuco; a Models-3/CMAQ simulation." Finished, Advisor
- 2009 Eddio Carimán, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Biogenic Sources Emission Inventory using WRF/MEGAN model." Finished, Advisor.
- 2009 Patricio Rojas, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, "Concentration Prediction of Fine Particulate Matter Using AOD from MODIS, CALIPSO, and MISR Satellites: The Case of

Santiago of Chile.” Finished, Advisor

- 2009 Carlos Oñate, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Mobile Sources Emission Inventory for Temuco using MOBILE6.2 and NONROAD models: 2005 and 2020.” Finished, Advisor.
- 2009 Francisco Hohmann, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Hybrid ARIMA and Artificial Neural Networks Models to Forecast Particulate Matter in Urban Areas: A Cluster Analysis.” Finished, Advisor
- 2008 Sergio Dávila, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Installation and startup of a laboratory for measuring particulate matter and gases emissions from wood stove devises.” Finished, Advisor
- 2008 Evelyn Castel, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Area Sources Emission Inventory for Temuco 2005 and 2020.” Finished, Advisor.
- 2008 Jaime Andrés Romero Acevedo, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Hexanuronic acid removal in eucalyptus kraft pulp using peracids” Finished, Co-Advisor.
- 2007 Felipe Humberto Barrientos Watson, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Characterization and Treatment of Liquid Effluents from a Cellulose Bleaching Step with Per-acids.” Finished, Co-Advisor.
- 2007 Juan Carlos Ortega, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “A Hybrid ARIMA and Artificial Neural Networks Model to Forecast Particulate Matter in Urban Areas: The Case of Temuco, Chile.” Finished, Advisor.
- 2006 Viviana Espinoza Carrasco and Susana Sánchez Valenzuela, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Technical and Economical Study for the Integral Management of Municipal Solid Waste of Temuco and Surrounding Counties.” Finished, Co-Advisor.
- 2006 Claudia del Carmen Paredes Tapia, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Study of the technical and economic feasibility for the implementation of a manual landfill manual for the Ercilla county, Chile.” Finished, Co-Advisor.
- 2003 Carolina Camelio and Carola Soto, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Emissions Inventory of Persistent Organic Pollutants in the Araucania Region, Chile.” Finished, Advisor.
- 2002 Daniela Fariña, (Bachelor Thesis of Chemical Engineering), Catholic University of Temuco, “Design of an aerobic biological pilot waste water treatment plant for teaching.” Finished, Advisor.

- 2001 José Raúl Henríquez L. y Jorge Mauricio Sandoval Errázuriz, (Bachelor Thesis of Chemical Engineering), Catholic University of Temuco, “Feasibility study on the technical and economic recovery and purification of bovine hemoglobin through the ultrafiltration process in the slaughterhouses of Chile.” Finished, Co-Advisor
- 2000 Martín Fierro, (Bachelor Thesis of Chemical Engineering), Catholic University of Temuco, “Process optimization of the trementine recovering in CMPC Celulosa S.A., Planta Pacífico.” Finished, Advisor.
- 2000 Antonieta Pilar Molina Inostroza, (Bachelor Thesis of Chemical Engineering), Catholic University of Temuco, “Reverse osmosis process simulation under a spiral configuration for the heavy metals elimination from industrial wastewater.” Finished, Advisor.
- 2000 Waldemar Andrés Cepeda Valenzuela, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Estimating the ecological risk associated with discharges of urban effluents in the middle of the river Cautín, Temuco, Region IX, Chile.” Finished, Co-Advisor.
- 2000 Christian Moisés Báez Valles, (Bachelor Thesis of Chemical Engineering), Catholic University of Temuco, “Concentration of sulphate cadmium and nickel sulphate solutions using a reverse osmosis system.” Finished, Co-Advisor.
- 2000 Luis Wolfredo Alejandro Henríquez, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Application of the ISO 14000 standard in the IX Region, Chile.” Finished, Co-Advisor.
- 1999 Marcelo Cofré, (Bachelor Thesis of Environmental Engineering), Catholic University of Temuco, “Water quality modeling of the Cautin river using MATLAB.” Finished, Advisor.

## **XII. Graduate and undergraduate design or re-design programs**

- 2015 Air Quality and Air Pollution Control Diploma, Department of Chemical Engineering, Universidad de Santiago de Chile.
- 2013 Auto-Evaluation Committee Member of the Environmental Engineering Program, Catholic University of Temuco
- 2011 Study to create 4 new under graduate programs in the College of Engineering, Civil Engineering, Geologic Engineering, Electronic and Telecommunication Engineering, and Mechanical Engineering.
- 2009 Management and coordination for all undergraduate programs of the College of Engineering beginning in 2010 under the new educational model UCTemuco (Model based on Competences).
- 2009 Creation of the Chemical Engineering, Common Plan in Engineering, and Accounting.
- 2007 Creation of the Air Quality Management minor
- 2007 Co design direction of Master program in Environmental Engineering
- 2007 Co design direction of Master program of Science in Engineering

### **XIII. Engineering Education and Management Projects**

- 2015 Air Quality and Air Pollution Control Diploma, University of Santiago of Chile.
- 2012-2013 Development of the Ph.D. Graduate Program of Engineering Science (Energy and Environment). Co-Author
- 2009-2012 DAAD-DIES Project Strategic Management. Technical University of Temuco (TUB), Escuela Politécnica Nacional de Quito (EPN), Universidad Católica de Temuco (UCT).
- 2006-2008 PID Project. Teaching Innovation Project. Simulators incorporating environmental processes in the curricula of environmental engineering careers environmental and civil engineering. Director.
- 1999-2001 MINEDUC Project. Strengthening the teaching of environmental sciences at the undergraduate programs at the Catholic University of Temuco.

### **XIV. Membership in Professional and Honorary Societies**

- **Air and Waste Management Association (A&WMA)**. Member from 2002 to day. 2003-2004, **President** of the Graduate Student Chapter  
Department of Civil and Environmental Engineering  
University of Tennessee  
Knoxville, TN 37996-2010, US  
(423) 974-7728 Fax: (423) 974-2669
- Member of the Academic Council of the Environmental Engineering Master Program, Universidad de Santiago de Chile, 2014 to date.
- Member of the Chilean Engineers Association (Colegio de Ingenieros de Chile A.G. in Spanish), 2010 to date.
- Member of the Chilean Engineers Institute (Instituto de Ingenieros de Chile in Spanish), 2010 to date.
- Editor Board del Journal of Alternative Energy, 2010-2015,  
[http://www.actapress.com/Content\\_of\\_Journal.aspx?JournalID=170](http://www.actapress.com/Content_of_Journal.aspx?JournalID=170)
- Editor Board del Electronic Journal of Energy & Environment, 2012-2017,  
<http://portalrevistas.uct.cl/index.php/ejee>
- Member of the **Scientific Steering Committee** of the First China A&WMA International Specialty Conference; Leapfrogging Opportunities for Air Quality Improvement, May 10-14, 2010, Xi'an, Shaanxi Province, China.
- **Reviewer** of the 2009 and 2010 AWMA's Critical Reviews.
- **Chair** of the Atmospheric Chemistry Technical Council of the A&WMA 2010-2012
- **Vice-Chair** of the Atmospheric Chemistry Technical Council of the A&WMA 2007-2009
- **Editor Board** of the VII Iberoamerican Congress of Environmental Chemistry and Physics and the XII Meeting of Analytical and Environmental Chemistry, October 6-10, 2014, Viña del Mar, Chile.
- **Chairman (Editor)** of an AB-1 and AB-2 Sessions at the 105<sup>th</sup> A&WMA Conference, June 2012, San Antonio, TX, US.

- **Chairman (Editor)** of an AB-1 and AB-2 Sessions at the 104<sup>th</sup> A&WMA Conference, June 2011, Florida, US.
- **Chairman (Editor)** of an AB-1 and AB-2 Sessions at the 103<sup>th</sup> A&WMA Conference, June 2010, Calgary, Canada.
- **Chairman (Editor)** of an AB-1 and AB-2 Sessions at the 102<sup>th</sup> A&WMA Conference, June 2009, Detroit, Michigan, US.
- **Chairman (Editor)** of an AB-1 and AB-2 Sessions at the 101<sup>th</sup> A&WMA Conference, June 2008, Portland, Oregon, US.
- **Co-Chairman (Editor)** of an AB-1 Session (Particulate matter pollution) at the 100<sup>th</sup> A&WMA Conference, June 26-28, 2007, Pittsburgh, Pennsylvania, US.

#### **XV. Achievements/Honors/Awards**

- **Recognition** from the University of Tennessee, Knoxville, **Office of Research & Engagement** for international research FONDEF project that was selected as one of the top ten scientific achievements for 2013 in Chile by the Chilean equivalent of the National Science Foundation. The project investigated the relationship between health risks and ultrafine particles from biomass combustion, 2014.
- In the processes of academic qualification 2010, 2011 and 2012, he has earned the maximum outstanding.
- **Recognition** for being the Chair of the Atmospheric Chemistry Session of the A&WMA's Technical Council, from 2009 to 2012.
- **Research Excellence Award**, Catholic University of Temuco, 2012.
- **Research Excellence Award**, Catholic University of Temuco, 2009.
- **Academic Excellence Award**, Catholic University of Temuco, 2008.
- **Regional Personality of the Year Award**, Productive Development Area, Araucania, 2007.
- **MECESUP UCT-02**, Ph.D. Scholarship for the academic years 2002-2004.
- **Best World Wide Student Chapter** of the A&WMA, 2003-2004. Dr. Díaz-Robles was the President.
- English Language Institute at the University of Tennessee, two Honor Certificates. (2002)
- **Ranked first** in the 1985 Academic Aptitude Exam, (P.A.A. in Spanish) (Chemistry and Biology) at the Limarí Province, Chile.

#### **XVI. Relevant Experience:**

- July 2014 to date: Full Professor of the Department of Chemical Engineering, Universidad de Santiago de Chile.
- 2012-2013, Titular Investigator of the Renewable Energies Research Nucleus. Catholic University of Temuco, Chile.
- January 2009- May 2012: Dean of the College of Engineering, Catholic University of Temuco, Chile.

- May 2010-to June 2014: Vice-Director of the Centre for Renewable Energies and Environmental Quality, CREEQ, Catholic University of Temuco, Chile.
- January 2006-to June 2014: Director of the Air Quality Unit, Catholic University of Temuco, Chile.
- January 2006-February 2008: Head of the School of Environmental Engineering, Catholic University of Temuco, Chile.
- January 2009 to June 2014: Associate Professor, Environmental Science School, Catholic University of Temuco, Chile.
- August 1998-December 2001: Academic Secretary, Environmental Science School, undergraduate program, Catholic University of Temuco, Chile.
- March 1998-December 2008: Assistant Professor, Environmental Science School, Catholic University of Temuco, Chile.
- September 1993-December 1997: Process Refinery Engineer, Lontue and Panamericana Norte Plants, COPRONA S.A., Unilever Chile S.A. January-February 1990: Professional Practice, Department of Supply, Compañía Minera Panulcillo S.A., ENAMI, Chile.
- January-February 1992: Professional Practice, Department of Production, Envases e Impresos S.A, Buin Plant, Santiago, Chile
- January-February 1991: Professional Practice, Chemical Laboratory, Compañía Minera Panulcillo S.A., ENAMI, Chile.

## **XVII. Representation and Participation Activities:**

- Universities of the Montevideo Group Association (AUGM), representing the University of Santiago of Chile in the environmental area (2016-2018).
- Member of the Scientific Consultative Council, Ministry of Environment, representing the University of Santiago of Chile in the air quality area (2015-2018).
- Member of the Consultative Council, COREMA Araucanía Region, 2014-2014.
- Member of the Directory of the Green Araucanía Foundation, 2013-2015
- Member of the Council of the Deans of Colleges of Engineering, 2009-2012
- Member of the Consultative Council, COREMA Araucanía Region, 2006-2008.
- Official Representation of the Catholic University of Temuco President during June 2007 in US. Visit at the University of Tennessee, Desert Research Institute, and the University of California, Davis, US.

## **XVIII. Extension activities**

2014-2016	Reviewer of the Journal Aerosol and Air Quality Research.
2011	Reviewer of the Journal Particuology.
2010-2015	Reviewer of the Journal of the Air & Waste Management Association
2010	Reviewer of the FONIS GRANT projects.
2009-2011	DAAD Project “Strategic Management of College of Engineering”, Catholic University of Temuco, Technical University of Berlin, and Escuela Politécnica Nacional, Ecuador, co-investigador (Dean)



2009 Extensión project, Open House of the College of Engineering. Director  
2007 Reviewer Journal Gestión Ambiental  
2004 Reviewer FONDECYT 106/0706 Project: A Hybrid approach to urban air  
quality modeling.  
2000 Reviewer of the Project “Calculation of Liquid-Vapor Equilibrium binary  
mixtures through equations of state of Redlich-Kwong Family.” Universidad  
de Playa Ancha.

#### **XIX. Other skills**

- Languages: English and Spanish.
- Computer skills: Multimedia Models (Level I, II, and III), Air Dispersion and Air Quality Models (SCREEN, CALINE, ISC, AERMOD, CALPUFF, OZIPPR, MOBILE6.2, MOVES, SMOKE, EGAS, CMAQ, MCIP, WRF-ARW, VERDI, Water Quality Models (AQUATOX, WASP7.0, CORMIX), MATLAB and Neural Networks, FORTRAN, and Statistic Software (SAS, SAS Enterprise Miner, NCSS, R-Project, and JMP).

Luis Alonso Díaz –Robles, Ph.D.