Wolfram Jahn

PhD

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Personal Information

Date of Birth 10th of October, 1979
Nationality Chilean/German
Marital Status Married

Education

Sept 2006 – April 2010 **PhD in Engineering**, *The University of Edinburgh*, Edinburgh, UK.

Thesis

Inverse Modelling to Forecast Enclosure Fire Dynamics

In my thesis I address the problem of parameter estimation in a CFD fire model by assimilating measurements using gradient optimisation. The gradient of the CFD code is obtained by tangent linear approximation.

Supervisors

Dr Guillermo Rein and Professor José Luis Torero

2004 – 2005 **MSc Mechanical Engineering**, *Pontificia Universidad Católica de Chile*, Santiago de Chile.

Master Thesis

Radiation Modelling in a Particle Cloud using Spherical Harmonics and Finite Volume Method

Supervisor

Professor Juan de Dios Rivera

1998 – 2004 **Mechanical Engineering**, *Pontificia Universidad Católica de Chile*, Santiago de Chile.

1996 – 1997 ***Colegio Alemán de Santiago (Deutsche Schule Santiago)***, *Santiago de Chile.*
1990 – 1996 ***Kurfürst Friedrich Gymnasium***, *Heidelberg, Germany.*
1986 – 1990 ***Neuberg Grundschule***, *Dossenheim, Germany.*

Employments

Jul 2021 – present **Associate Professor**, *Department of Mechanical Engineering*, Pontificia Universidad Católica de Chile.

Jul 2014 – Jun 2021 **Assistant Professor**, *Department of Mechanical Engineering*, Pontificia Universidad Católica de Chile.

Sep 2013 – Jul 2014 **Regional Manager**, *Raindance Science Inc.*, Santiago, Chile–Coral Springs, USA.
Smoke modelling; Egress modelling; Fire Safety Engineering

Feb 2012 – Aug 2013 **Research Engineer**, *ChapmanBDSP, Consulting Engineers*, London, UK.
CFD simulations for the built environment (Pedestrian comfort studies; Natural ventilation studies; Smoke management modelling); Daylight simulation with Radiance (Bash scripting); Software development (inhouse thermal model for buildings and masterplanning).

2010 – 2012 **Research Fellow**, *Queen Mary, University of London*, London, UK.
CFD based Shape Optimisation using parametric CAD representation. We combine CFD solvers and their adjoint sensitivities with surface sensitivities obtained from a CAD system, integrating both in an optimisation loop.

2005 – 2006 **Revenue Control Analyst**, *LAN Airlines S.A.*, Santiago de Chile.
Testing and implementation of a new revenue accounting system for LAN Airlines passenger services. Duties involved developing and analysing test cases, assessing advantages and disadvantages and suggesting improvements to the developers.

Awards and Scholarships

2009 U.S. National Science Foundation – Travel expenses, accommodation and registration fees of the 8^{th} Adjoint Workshop in PA, U.S.A.

2006 Alβan Programme High level Scholarship for Latin America – Grant N$^{\underline{o}}$ E06D100038CL

2006 UK Technology Strategy Board's Collaborative Research and Development Programme

Teaching

2014 – present **Energy Conversion**, *School of Engineering*, Pontificia Universidad Católica, undergraduate.

2014 – present **Combustion**, *School of Engineering*, Pontificia Universidad Católica, postgraduate.

2014 – present **Fundamentals of CFD**, *School of Engineering*, Pontificia Universidad Católica, postgraduate.

2014 – present **Analysis of Thermal Systems**, *School of Engineering*, Pontificia Universidad Católica, postgraduate.

2009 **Fire Modelling**, *IMAST S.C.*, Naples, Italy.

2008 – 2010 **Fire Modelling**, *School of Engineering*, The University of Edinburgh.

Thesis supervision

2022 – present **PhD**, *School of Engineering*, Pontificia Universidad Católica, Ignacio Calderón.

2019 – present **PhD**, *School of Engineering*, Pontificia Universidad Católica, Francisco Montero.

2019 – present **PhD**, *School of Engineering*, Pontificia Universidad Católica, Mario di Capua.

2021 – present **MSc**, *School of Engineering*, Pontificia Universidad Católica, Sebastián Nash.

2019 – 2019 **MSc**, *School of Engineering*, Pontificia Universidad Católica, Tomás Salinger.

2016 – 2018 **MSc**, *School of Engineering*, Pontificia Universidad Católica, Sofía Figueroa.

2017 – 2018 **MSc**, *School of Engineering*, Pontificia Universidad Católica, Daniel Montoya.

2016 – 2017 **MSc**, *School of Engineering*, Pontificia Universidad Católica, Rafael Zamorano.

2015 – 2017 **MSc**, *School of Engineering*, Pontificia Universidad Católica, Andrés Arévalo.

2014 – present **Undergraduate**, *School of Engineering*, Pontificia Universidad Católica, 20 students.

Research Projects

2022 – 2027 **ANID**, *Centro Basal CENAMAD– Grant FB210015*, Principal Investigator.

2015 **CONICYT**, *Fondecyt de Iniciación – Grant Nº11150757*.

2006 – 2010 **Technology Strategy Board, UK**, *FireGrid: A cross-disciplinary collaborative project to pursue fundamental research for developing real time emergency response systems using the Grid*, The University of Edinburgh.
www.firegrid.org

2010 – 2012 **Seventh Framework Programme, EU**, *FlowHead: Fluid Optimisation Workflows for Highly Effective Automotive Development Processes*, Queen Mary, University of London.
flowhead.sems.qmul.ac.uk

Publications (H-Index 9 and 369 citations according to Scopus)

Peer reviewed journal articles (ISI)

2020 **Krol, A., Jahn, W., Krajewski, G., Krol, M., Wegrzynski, W.**, *A Study on the Reliability of Modeling Compartment Fires With Respect to Thermocouple Response and Sprinkler Activation*, Buildings, Vol. 12.
doi:10.3390/buildings12010077

2022 **Jahn, W., Urban, J., Rein, G.**, *Powerlines and Wildfires: Overview, Perspectives, and Climate Change*, IEEE Power & Energy Magazine, January/February 2022.
doi:10.1109/MPE.2021.3122755

2021 **Di Capua, M., Jahn, W.**, *Performance assessment of thermoelectric self-cooling systems for electronic devices*, Applied Thermal Engineering, Vol. 193.
doi:10.1016/j.applthermaleng.2021.117020

2021 **Montero, F., Lamba, R., Ortega, A., Jahn, W., Guzmán, A.**, *A novel 24-hour day-night operational solar thermoelectric generator using phase change materials*, Journal of Cleaner Production, Vol. 296.
doi:10.1016/j.jclepro.2021.126553

2021 **Jahn, W., Sazunic, F., Sing-Long, C.**, *Towards Real-Time Fire Data Synthesis using Numerical Simulations*, Journal of Fire Sciences, online.
doi:10.1177/0734904121993449

2021 **Xi, X., Torero, J.L., Jahn, W.**, *Data driven forecast of droplet combustion*, Proceedings of the Combustion Institute, Vol. 38.
doi:10.1016/j.proci.2020.05.012

2020 **Montoya, D.., Jahn, W., Rivera, J.**, *Using a Porous Medium Model to Simulate the Air Flow Through Fog Water Collectors*, Journal of Porous Media, Vol. 23.
doi:10.1615/JPorMedia.2020029819

2020 **Wegrzynski, W., Krajewski, G., Tofilo, P., Jahn, W., Krol, A., Krol, M.**, *3D Mapping of the Sprinkler Activation Time*, Energies, Vol. 13.
doi:10.3390/en13061450

2020 **Mariño, O., Muñoz, F. , Jahn, W.**, *Soot production modelling for operational computational fluid dynamics fire simulations*, Journal of Fire Sciences, Vol. 38.
doi:10.1177/0734904120905579

2019 **Figueroa, S., Rivera, J., Jahn, W.**, *Influence of Permeability on the Rate of Fire Spread over Natural and Artificial Pinus radiata Forest Litter*, Fire Technology, Vol. 55.
doi:10.1007/s10694-019-00824-w

2019 **Jiajie, Z., Jahn, W., Rein, G.**, *Computer simulation of sunlight concentration due to façade shape: application to the 2013 Death Ray at Fenchurch Street, London*, Journal of Building Performance Simulation, Vol. 12.
doi:doi.org/10.1080/19401493.2018.1538389

2018 **Ríos, O.,Jahn, W., Pastor, E., Valero, M., Planas, E.**, *Interpolation framework to speed up near-surface wind simulations for data-driven wildfire applications*, International Journal of Wildland Fire, Vol. 27.
doi:doi.org/10.1071/WF17027

2017 **Jahn, W.**, *Using suppression and detection devices to steer CFD fire forecast simulations*, Fire Safety Journal, Vol. 91.
doi:10.1016/j.firesaf.2017.03.062

2016 **Fehrmann, S., Jahn, W., Rivera, J.**, *Permeability comparison of natural and artificial pinus radiata forest litters*, Fire Technology, Vol. 53(3).
doi:10.1007/s10694-016-0631-1

2015 **Jahn, W., González, O., Rivera, J., Torero, J.L.**, *Using Computational Fluid Dynamics in the forensic analysis of a prison fire*, Forensic Science International, Vol. 253.
doi:10.1016/j.forsciint.2015.06.003

2014 **Ríos, O., Jahn, W., Rein, G.**, *Forecasting Wind-Driven Wildfires Using An Inverse Modelling Approach*, Natural Hazards and Earth System Sciences, Vol. 14.
doi:10.5194/nhess-14-1491-2014

2013 **Xu, S., Jahn, W., Müller, J.-D.**, *CAD-based shape optimisation with CFD using a discrete adjoint*, International Journal for Numerical Methods in Fluids, Vol. 74(3).
doi:10.1002/fld.3844

2012 **Jahn, W., Rein, G., Torero, J.L.**, *Forecasting fire dynamics using inverse computational fluid dynamics and tangent linearisation*, Advances in Engineering Software, Vol. 47(1).
doi:10.1016/j.advengsoft.2011.12.005

2012 **Rivera, J., Davies, M., Jahn, W.**, *Flammability and the Heat of Combustion of Natural Fuels: a review*, Combustion Science and Technology, Vol. 184(2).
doi:10.1080/00102202.2011.630332

2011 **Jahn, W., Rein, G., Torero, J.L.**, *Forecasting Fire Growth using an Inverse Zone Modelling Approach*, Fire Safety Journal, Vol. 46(3).
doi:10.1016/j.firesaf.2010.10.001

2010 **Jahn, W., Rein, G., Torero, J.L.**, A Posteriori *Modelling of the growth phase of Dalmarnock Fire Test One*, Building and Environment, Vol 46, Issue 5.
doi:10.1016/j.buildenv.2010.11.001

2009 **Cowlard, A., Jahn, W., Abecassis-Empis, C., Rein, G., Torero, J.L.**, *Sensor Assisted Fire Fighting*, Fire Technology, Vol. 35.
doi:10.1007/s10694-008-0069-1

2009 **Rein, G., Torero, J.L., Jahn, W., Stern-Gottfried, J., Ryder, N., Desanghere, S., Lázaro, M., Mowrer, F., Coles, A., Joyeux , D., Alvear, D., Capote, J., Jowsey, A., Abecassis-Empis, C., Reszka, P.**, *Round-Robin Study of* a priori *Modelling Predictions of The Dalmarnock Fire Test One*, Fire Safety Journal, Vol. 44.
doi:10.1016/j.firesaf.2008.12.008

Relevant Conference Presentations

2017 **Jahn, W.**, *Using suppression and detection devices to steer CFD fire forecast simulations*.
Presented at the International Association for Fire Safety Science at University of Lund, Sweden

2011 **Jahn, W., Jens-D. Müller**, *Continuity in CAD integrated shape optimisation*, Eccomas 2011.
Antalya, Turkey

2011 **Jahn, W., Rein, G., Torero, J.L.**, *Forecasting Fire Growth using an Inverse CFD Modelling Approach in a Real-Scale Fire Test*, Fire Safety Science, Vol. 10, pp: 1349–1358, doi:10.3801/IAFSS.FSS.10-1349.
Presented at the International Association for Fire Safety Science at University of Maryland, USA

2008 **Jahn, W., Rein, G., Torero, J.L.**, *The Effect of Model Parameters on the Simulation of Fire Dynamics*, Fire Safety Science, Vol. 9, doi:10.3801/IAFSS.FSS.9-1341.
Presented at the International Association for Fire Safety Science at University of Karlsruhe, Germany

Consultancy work

2021–2022 **for IKEA**, Santiago, Chile.
CFD fire simulations to assess egress time requirements for IKEA stores to be built in Santiago.

2020 **for Minera Yanacocha**, Cajamarca, Perú.
Forensic analysis of a fire in an hydraulic excavator.

2020 **for ARCADIS Chile SpA**, Santiago, Chile.
CFD simulations of vortex production by bridge structure, Quellaveco, Peru.

2020–2021 **for Grupo Patio (Foster and Partners)**, Santiago, Chile.
Fire safety engineering design for timber residential building in Santiago de Chile.

2019 **for Codelco**, Santiago de Chile.
Fire scenario simulations for the conveyor belt tunnel at the *Nuevo Nivel Mina, El Teniente*.

2018 **for E^3 Ingeniería**, Santiago, Chile.
CFD fire simulations to assess egress time requirements for the Marga Marga Hospital project in Viña del Mar.

2018 **for E^3 Ingeniería**, Santiago, Chile.
CFD fire simulations to assess egress time requirements for the newly built Félix Bulnes Hospital in Santiago de Chile.

2017 **for Minsur**, Juliaca, Perú.
Forensic analysis of a fire in a rock crusher.

2017 **for Nuevo Pudahuel**, Santiago, Chile.
Revision of fire safety design at terminal 2 of Pudahuel International Airport.

2017 **for Autopista El Maule**, Santiago, Chile.
Analysis of fire risk in the Chacabuco tunnel.

2013 **for Raindance Science Inc.**, Santiago, Chile.
CFD simulations to assess the fire safety performance of the newly built mall Los Dominicos (Santiago).

2012 **for Raindance Science Inc.**, Buenos Aires, Argentina.
CFD simulations to model the interaction of smoke with the ventilation system in the atrium of the Torre Macro building (Buenos Aires).

2011 **for DICTUC S.A.**, Santiago, Chile.
Forensic analysis of a fire in a national prison facility – CFD simulations to model smoke movement.

2010 **for I-RiSC – International Risk and Safety Consultants**, Bonn, Germany.
Fire Safety Surveys for Insurance purposes (on behalf of RSE insurance group).

2009 **for International Fire Investigators and Consultants**, Glasgow, UK.
Computational simulation of time to sprinkler activation in the 2005 Magna Park Warehouse Fire.

2008 **for Rushbrook Consultants – Fire, Safety & Risk Engineers**, Edinburgh, UK.
Assessment on the fire safety of a LG manufacturing plant.

2007 – 2008 **for Dartford Tunnel**, London, UK.
Study of viability of a water mist system in the Dartford Tunnel.

IT skills

Languages C/C++, Python, Fortran, Java, shell scripting (bash, ksh), Lisp

Platforms GNU/Linux, Unix (BSD, Solaris, OS X), Windows

Engineering CATIA, OpenFOAM, Fluent, Ansys CFX, FDS, Radiance

Tools LaTeX, Emacs, git, awk, Qt

Languages

Spanish	**Fluent**	*Native language.*
German	**Fluent**	*Native language.*
English	**Fluent**	*Speaking, reading, and writing.*