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Guiding safe and sustainable technological innovation under uncertainty: a case study of III-V/silicon photovoltaics

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Devoting four years of one's life to the study of one specific topic is a very big commitment. It is a decision to embark on a long journey full of challenges, gratifications, unexpected detours, surprising outcomes, many questions and some answers. In this journey, it would have been very easy to lose my course were it not for the many people willing to share a vision, an insight, an idea, an opinion, or simply lend an ear.

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List of publications

Papers in this thesis

- Blanco, C.F., Cucurachi, S., Dimroth, F., Guinée, J.B., Peijnenburg, W.J.G.M. & Vijver, M.G. (2020), Environmental impacts of III–V/silicon photovoltaics: life cycle assessment and guidance for sustainable manufacturing, *Energy and Environmental Science* 13(11): 4280-4290.
- Blanco, C.F., Cucurachi, S., Guinée, J.B., Vijver, M.G., Peijnenburg, W.J.G.M., Trattnig, R. & Heijungs, R. (2020), Assessing the sustainability of emerging technologies: A probabilistic LCA method applied to advanced photovoltaics, *Journal of Cleaner Production* 259: 120968.
- Blanco, C.F., Cucurachi, S., Peijnenburg, W.J.G.M., Beames, A. & Vijver, M.G. (2020), Are Technological Developments Improving the Environmental Sustainability of Photovoltaic Electricity? *Energy Technology* 8(11): 1901064.

Related publications

- Koese, M., Blanco, C.F., Breeman, G.E., Vijver, M.G. (2022) Towards a more resource-efficient solar future in the EU: an actor-centered approach, *Environ. Innov. Soc. Transit.* (in review).
- Cucurachi, S., Blanco, C.F., Steubing, B.R.P. & Heijungs, R. (2022), Implementation of uncertainty analysis and moment-independent global sensitivity analysis for full-scale life cycle assessment models, *Journal of Industrial Ecology*: 13194.
- Adrianto, L.R., van der Hulst, M.K., Tokaya, J.P., Arvidsson, R., Blanco, C.F., Caldeira, C., Guillén-Gonsálbez, G., Sala, S., Steubing, B.R.P., Buyle, M., Kaddoura, M., Navarre, N.H., Pedneault, J., Pizzol, M., Salieri, B., van Harmelen, T. & Hauck, M. (2021), How can LCA include prospective elements to assess emerging technologies and system transitions? The 76th LCA discussion forum on life cycle assessment, 19 November 2020, *The International Journal of Life Cycle Assessment* 26(8): 1541-1544.
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- Blanco, C.F., Penedo De Sousa Marques, A. & van Bodegom, P.M. (2018), An integrated framework to assess impacts on ecosystem services in LCA demonstrated by a case study of mining in Chile, *Ecosystem Services* 30(Part B): 211-219.

Curriculum Vitae

Carlos Felipe Blanco was born in Barranquilla Colombia, where he obtained a dual Colombian Bachillerato and U.S. High School degree from Karl C. Parrish School in 1998. Carlos Felipe graduated amongst the top of his class and was awarded with the prestigious *Andres Bello* award from the Colombian Ministry of Education for achieving the highest regional score in the ICFES state examinations.

In 2004, Carlos Felipe obtained his bachelor's degree in Environmental Engineering from Universidad de Los Andes in Bogota, Colombia. Here he was again awarded by the Ministry of Education for ranking amongst the top 10 national scores in the ECAES examinations for the quality of higher education. His thesis project "*Aquamod: An Educational Software Tool to Model Transport of Pollutants in Surface Waters*" was graded with a perfect score.

Carlos Felipe went on to work for 8 years in the mining industry as a Health, Safety, Environment and Community Relations (HSEC) manager in various countries in Latin America including Chile, Argentina, Guyana, Peru, Colombia and Brazil. In this role, Carlos Felipe led social and environmental impact studies for large-scale mining and minerals exploration projects, developed mine closure plans and led several critical incident investigations. He was also tasked with environmental auditing and implementing ISO14001 and OHSAS18001 health and safety standards.

In 2014, Carlos Felipe moved to the Netherlands to pursue a M.Sc. degree in Industrial Ecology at the Institute of Environmental Sciences (CML). In his M.Sc. thesis, Carlos Felipe developed a framework to assess ecosystem services in Life Cycle Assessment (LCA), which was demonstrated by a case study of water supply for the mining industry in the north of Chile. The thesis was awarded the Stans prize by CML in 2016 and later published in the journal *Ecosystem Services*.

Throughout the period 2014-2020, Carlos Felipe also worked part-time as a sustainability consultant for the energy and forestry industries and developed software solutions for stakeholder engagement programs in several large-scale mining projects.

In his free time, Carlos Felipe is an avid reader of geopolitics and philosophy and devotes considerable time to music composition and production. His artistic work can be found in Spotify under the artist name *Galactic Desperates* and the soon-to-be-released collaboration *Chaos, Order and the Lines*.