

SATYAJEET SHEETAL BHONSALE, PhD

Uncertainty-Aware Modelling, Optimisation & Control of (Bio)Chemical Processes

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EDUCATION

PhD in Chemical Engineering, KU Leuven, Belgium

2015 – 2020

Thesis: "Numerical methods for predictive milling of Active Pharmaceutical Ingredients: Modelling of spiral jet mills."

Supervisors: Prof. Jan Van Impe (KU Leuven), Bard Stokbroekx (Janssen Pharmaceutica). VLAIO Baekeland Mandate.

MSc in Chemical Engineering, cum laude, KU Leuven, Belgium

2013 – 2015

BTech in Chemical Engineering, Highest Distinction (8.24/10), Dr. B. A. Tech. University, Lonere, India

2009 – 2013

Dutch Language NT2 (B2), CVO, Ghent

2025

ACADEMIC APPOINTMENTS

PostDoctoral Researcher, KU Leuven / BioTeC+ (Prof. Van Impe)

Jan 2020 – present

- Coordinate computational research strategy for the BioTeC+ team; co-supervise 8 PhD researchers; lead the uncertainty-aware modelling research line.

Visiting Researcher, Universitat Politècnica de València, SB2C Lab

(Prof. Jesús Picó)

Apr 2024 – Aug 2024

- FWO-funded mobility. Modelling of gene expression with host-aware systems; foundation for the μ 4C FWO project.

Visiting Researcher, University of Leeds, Ghadiri Group

Jun 2018 – Dec 2018

- CFD-DEM modelling of spiral jet mills; resulted in journal publication.

PhD Scientist (VLAIO Baekeland Mandate), Janssen Pharmaceutica

Mar 2016 – Feb 2020

- Industrial PhD developing mechanistic and computational models for pharmaceutical milling.

Doctoral Researcher, KU Leuven

Oct 2015 – Dec 2020

KEY ACHIEVEMENTS (HIGHLIGHTS)

- independent research line and funding:** Conceived and secured the FWO μ 4C Research Project (€630,000) — first major competitive grant built around my own scientific agenda. Computational co-PI; project couples reduced metabolic networks with gene-circuit models under uncertainty.
- Uncertainty-aware modelling:** Established a research line on uncertainty-aware (bio)chemical process modelling at KU Leuven/BioTeC+: 10+ peer-reviewed articles, a widely cited book chapter, and direct supervision of 2 PhDs on this line.
- ESCAPE 35 leadership:** Co-chair of the Local Organising Committee, European Symposium on Computer Aided Process Engineering (Ghent, 2025; ~730 participants). Co-edited proceedings (423 full papers + 140 short papers).
- Funding track record:** Contributed to writing/defending 10+ successful proposals at Flemish, national, and EU level (FWO, VLAIO-Baekeland x3, MSCA-ITN E-MUSE, ERA-NET BlueBioChain, EU-RIA ALFAFUELS, MSCA-DN FAIRomics).
- Curriculum design:** Co-developed two computational modules of the Erasmus Mundus Food4S programme. 78% of students rated teaching as "Very Good" or "Good".

GRANTS, AWARDS & FUNDING

As (Co-)Principal Investigator

- FWO Research Project G0A9H26N: μ 4C: Managing Uncertainty and Complexity for Cybergenetic Predictive Control of Sustainable Bioprocesses. €630,000. Computational co-PI. (Awarded Dec 2025.)

Personal Mobility & Travel Grants

- FWO International Mobility Grant: Universitat Politècnica de València (Apr–Aug 2024).
- FWO Travel Grant: Foundations of Systems Biology & Engineering (FOSBE), Boston, USA (Aug 2022).
- VLAIO Baekeland Mandate: Industrial PhD with Janssen Pharmaceutica (2016–2020).

Substantial Contributions to Funded Projects (writing, conceptual, training of candidates)

- VLAIO Baekeland HBC.2020.2214: Modelling and control of crystallisation (Janssen Pharmaceutica).
- VLAIO Baekeland HBC.2022.0177: Data-driven modelling of continuous manufacturing.
- MSCA-ITN E-MUSE 956126: Complex microbial ecosystems.
- MSCA-DN FAIROmics 101120449: Risk-averse multiscale optimisation.
- EU-RIA ALFAFUELS 101122224: Bioprocess optimisation (Synechocystis).
- ERA-NET BlueBioChain: Sustainable blue biotechnology.
- MSCA-ITN PROTECT 813329: Climate-impact modelling.

PUBLICATIONS

For the most recent list, please visit KU Leuven Lirias: <https://lirias.kuleuven.be/cv?Username=u0093798>

As of 30/4/2026,

Total: 24 peer-reviewed articles, h-index 8 (WoS)/12 (Google Scholar), citations 198 (WoS)/ 324 (Google Scholar).

Peer-Reviewed Journal Articles

- Lapiedra Carrasquer, P., Muñoz López, C.A., Dockx, K., Van Impe, J.F M., Bhonsale, S. (2026). Modeling continuous direct compression processes with inherent delay using SINDYc and Bayesian inference. Computers & Chemical Engineering, Art.No. 109646. doi: 10.1016/j.compchemeng.2026.109646
- Wang, J., Hashem, I., Bhonsale, S., Van Impe, J.F M. (2026). Signaling dynamics in microbial communities: A reduced-complexity mathematical analysis. Chemical Engineering Science, 319, Art.No. ARTN 121962. doi: 10.1016/j.ces.2025.121962
- Wang, J., Hashem, I., Bhonsale, S., Verheyen, D., Luo, H., Van Impe, J.F M. (2025). Individual-based modelling (IbM) in food microbiology: A comprehensive guideline. Food Research International, 213, Art.No. ARTN 116408. doi: 10.1016/j.foodres.2025.116408
- Quillo, G.L., Bhonsale, S., Collas, A., Van Impe, J.F M., Xiouras, C (2025). Hybrid Semi-mechanistic and Machine Learning Solubility Regression Modeling for Crystallization Process Development. Crystal Growth & Design, 25 (4), 1111-1127. doi: 10.1021/acs.cgd.4c01451
- Wang, J., Hashem, I., Bhonsale, S., Van Impe, J.F M. (2025). Individual-based modeling unravels spatial and social interactions in bacterial communities. ISME Journal, 19 (1), Art.No. wraf116. doi: 10.1093/ismejo/wraf116
- Mores, W., Bhonsale, S., Logist, F., Van Impe, J.F M. (2025). Accelerated enumeration of extreme rays through a positive-definite elementarity test. Bioinformatics, 41 (1), Art.No. ARTN btae723. doi: 10.1093/bioinformatics/btae723
- Katsini, L., Bhonsale, S., Roufou, S., Griffin, S., Valdramidis, V., Akkermans, S., Polanska, M., Van Impe, J. (2024). Milk contamination in Europe under anticipated climate change scenarios. Frontiers in Sustainable Food Systems, 8, Art.No. 1468698. doi: 10.3389/fsufs.2024.1468698
- Katsini, L., Lopez, C.A M., Bhonsale, S., Roufou, S., Griffin, S., Valdramidis, V., Akkermans, S., Polanska, M., Van Impe, J. with Van Impe, J. (corresp. author) (2024). Modeling climatic effects on milk production.

Computers And Electronics In Agriculture, 225, Art.No. ARTN 109218.
doi:10.1016/j.compag.2024.109218

- Beitia, E., Ebert, E., Plank, M., Chanos, P., Hertel, C., Bhonsale, S., Van Impe, J., Heinz, V., Aganovic, K., Valdramidis, V. (2024). Modelling of Salmonella Enteritidis inactivation in liquid whole egg under dynamic manothermosonication treatments. *Innovative Food Science & Emerging Technologies*, 92, Art.No. 103597. doi: 10.1016/j.ifset.2024.103597
- De Buck, V., Sbarciog, M., Cras, J., Bhonsale, S., Polanska, M., Van Impe, J. (2023). Critical analysis of the use of white-box versus black-box models for multi-objective optimisation of small-scale biorefineries. *Frontiers in Food Science and Technology*, 3, Art.No. 1154305. doi: 10.3389/frfst.2023.1154305
- Quillo, G.L., Bhonsale, S., Collas, A., Xiouras, C., Van Impe, J.F M (2023). Iterative model-based optimal experimental design for mixture-process variable models to predict solubility. *Chemical Engineering Research & Design*, 189, 768-780. doi: 10.1016/j.cherd.2022.12.006
- Mores, W., Nimmegeers, P., Hashem, I., Bhonsale, S., Van Impe, J. (2022). Multi-objective optimization under parametric uncertainty: A Pareto ellipsoids-based algorithm. *Computers & Chemical Engineering*, 169, Art.No. 108099. doi: 10.1016/j.compchemeng.2022.108099
- Sbarciog, M., De Buck, V., Akkermans, S., Bhonsale, S., Polanska, M., Van Impe, J. (2022). Design, Implementation and Simulation of a Small-Scale Biorefinery Model. *Processes*, 10 (5), Art.No. 829. doi: 10.3390/pr10050829
- Bhonsale, S., Mores, W., Van Impe, J. (2021). Dynamic Optimisation of Beer Fermentation under Parametric Uncertainty. *Fermentation-Basel*, 7 (4), Art.No. 285. doi: 10.3390/fermentation7040285
- Nimmegeers, P., Vercammen, D., Bhonsale, S., Logist, F., Van Impe, J. (2021). Metabolic Reaction Network-Based Model Predictive Control of Bioprocesses. *Applied Sciences-Basel*, 11 (20), Art.No. 9532. doi: 10.3390/app11209532
- Katsini, L., Bhonsale, S., Akkermans, S., Roufou, S., Griffin, S., Valdramidis, V., Misiou, O., Koutsoumanis, K., Muñoz López, C.A., Polanska, M., Van Impe, J. (2021). Quantitative methods to predict the effect of climate change on microbial food safety: A needs analysis. *Trends In Food Science & Technology*, 126, 113-125. doi: 10.1016/j.tifs.2021.07.041
- Lunardon Quillo, G., Bhonsale, S., Gielen, B., Van Impe, J.F., Collas, A., Xiouras, C. (2021). Crystal Growth Kinetics of an Industrial Active Pharmaceutical Ingredient: Implications of Different Representations of Supersaturation and Simultaneous Growth Mechanisms. *Crystal Growth & Design*, 1-18. doi: 10.1021/acs.cgd.1c00677
- Bhonsale, S., Scott, L., Ghadiri, M., Van Impe, J. (2021). Numerical simulation of particle dynamics in a spiral jet mill via coupled CFD-DEM. *Pharmaceutics*, 13 (7), Art.No. 937. doi: 10.3390/pharmaceutics13070937
- Muñoz López, C.A., Bhonsale, S., Peeters, K., Van Impe, J. (2020). Manifold Learning and Clustering for Automated Phase Identification and Alignment in Data Driven Modeling of Batch Processes. *Frontiers in Chemical Engineering*. doi: 10.3389/fceng.2020.582126
- Bhonsale, S., Stokbroekx, B., Van Impe, J. (2020). Assessment of the parameter identifiability of population balance models for air jet mills. *Computers & Chemical Engineering*, Art.No. 107056. doi: 10.1016/j.compchemeng.2020.107056
- Nimmegeers, P., Bhonsale, S., Telen, L., Van Impe, J. (2020). Optimal experiment design under parametric uncertainty: a comparison of a sensitivities based approach versus a polynomial chaos based stochastic approach. *Chemical Engineering Science*, Art.No. 115651. doi: 10.1016/j.ces.2020.115651
- Bhonsale, S., Muñoz López, C.A., Van Impe, J. with Muñoz López, C.A. (joint first author), Van Impe, J. (corresp. author) (2019). Global Sensitivity Analysis of a Spray Drying Process. *Processes*, 7 (9). doi: 10.3390/pr7090562
- Bhonsale, S., Telen, D., Stokbroekx, B., Van Impe, J. (2019). Comparison of numerical solution strategies for population balance model of continuous cone mill. *POWDER TECHNOLOGY*, 345, 739-749. doi: 10.1016/j.powtec.2019.01.043

- Bhonsale, S., Telen, D., Stokbroekx, B., Van Impe, J. (2018). An Analysis of Uncertainty Propagation Methods Applied to Breakage Population Balance. *Processes*, 6 (12), Art.No. 255. doi: 10.3390/pr6120255

Book Chapters

- Bhonsale, S., Nimmegeers, P., Akkermans, S., Telen, D., Stamati, I., Logist, F., Van Impe, J. (2022). Optimal experiment design for dynamic processes. In: *Simulation and Optimization in Process Engineering*, Chapter 10, (243-271). Elsevier. ISBN: 9780323850438. doi: 10.1016/B978-0-323-85043-8.00010-6

Edited Books

- Van Impe, J., Leonard, G., Bhonsale, S., Polanska, M., Logist, F. (Eds) *Proceedings of ESCAPE35 – European Symposium on Computer Aided Chemical Engineering*, Ghent, Belgium. July 6 – 9 2025. In: *System & Control Transactions*, PSE Press: Hamilton. ISBN: 978-1-7779403-3-1. doi: 10.69997/sct.173479
- Van Impe, J., Leonard, G., Bhonsale, S.S., Polanska, M., Logist, F. (Eds.) (2025). *35th European Symposium on Computer Aided Process Engineering (ESCAPE 35): Book of Short Papers*. EUROSIS-ETI. ISBN: 978-9-492859-36-5.

Conference Proceedings

- Floros, S., Bhonsale, S., Akkermans, S., Van Impe, J. (2026) Practical Identifiability and Optimal Experiment Design for Hybrid Cybernetic Models: An E.Coli Case Study. *ESCAPE36-Sheffield*. Accepted.
- Kapavarapu, P., Bhonsale, S., Akkermans, S., and Van Impe, J. (2026) Sensitivity-Based Comparison of Resource Competition Models for Optogenetic Gene Circuit Design. *ESCAPE36-Sheffield*. Accepted.
- Pizzaro Galleguillos, F., Bhonsale, S., Van Impe, J. (2026), Uncertainty Quantification of Stochastic Gene Expression. *ESCAPE36-Sheffield*. Accepted.
- Wang, J., Hashem, I., Bhonsale, S., Van Impe, J. (2025) Individual-based modelling reveals emergent stability in microbial competitive interactions. *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent.
- Katsini, L., Bhonsale, S., Roufou, S., Valdramidis, V., Polanska, M., Van Impe, J. (2025) Modeling Climate Change Impact on Dairy: an Uncertainty Analysis. *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent. ISBN: 978-9-492859-36-5
- Katsini, L., Bhonsale, S., Van Impe, J. (2025) Bioprocess Control Using Hybrid Mechanistic and Gaussian Process Modeling. *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent. ISBN: 978-9-492859-36-5
- Lapiedra Carrasquer, P., Bhonsale, S., Muñoz López, C., Dockx, K., Van Impe, J. (2025) Data-driven Modeling of a Continuous Direct Compression Tableting Process using SINDy. *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent. doi: 10.69997/sct.147925
- Pizzaro Galleguillos, F., Bhonsale, S., Van Impe, J. (2025) Bifurcation Behaviour of CSTR Models Under Parametric Uncertainty: A PCE-Based Approach. *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent. ISBN: 978-9-492859-36-5
- Floros, S., Bhonsale, S., Gaspari, S., Akkermans, S., Van Impe, J. Modelling the in vitro Food Digestion SIMulator (FoodSIM). *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent. doi: 10.69997/sct.162389
- Mores, W., Bhonsale, S., Logist, F., Van Impe, J. Metabolic network reduction based on extreme pathways. *European Symposium on Computer Aided Chemical Engineering (ESCAPE35)* 6-9 July 2025, Ghent. doi: 10.69997/sct.132855
- Bhonsale, S.; Boada, Y; Vignoni, A.; Picó, J.; Van Impe J. (2025). Sensitivity of inducible gene expression. Presented at the MATHMOD Conference 2025 in Vienna, 19 – 21 February, 2025. doi: 10.34726/9016
- Katsini, L., Wang, J., Hashem, I., Bhonsale, S., Van Impe, J. (2024). Climate change effect on microbial interactions using surrogate modelling of an individual-based model. In: *Computer Aided Chemical Engineering: vol. 53*, (2533-2538). Presented at the 34th European Symposium On Computer Aided Process Engineering / 15th International Symposium On Process Systems Engineering, Florence. ISBN: 9780443288241. doi: 10.1016/B978-0-443-28824-1.50423-3

- Katsini, L., Bhonsale, S., Roufou, S., Griffin, S., Valdramidis, V., Akkermans, S., Polanska, M., Van Impe, J. (2024). Climate change threatens the food safety of the supply chain. In: Computer Aided Chemical Engineering: vol. 53, (2545-2550). Presented at the 34th European Symposium On Computer Aided Process Engineering / 15th International Symposium On Process Systems Engineering, Florence. ISBN: 9780443288241.
- Mores, W., Bhonsale, S., Logist, F., Van Impe, J. (2024). Stochastic Extreme Pathway generation in view of metabolic network reduction. In: Computer Aided Chemical Engineering: vol. 52, (2539-2544). Presented at the 34th European Symposium on Computer Aided Process Engineering (ESCAPE34), Florence. ISBN: 978-0-443-28824-1. doi: 10.1016/B978-0-443-28824-1.50424-5
- Lunardon Quillo, G., Mores, W., Bhonsale, S., Collas, A., Xiouras, C., Van Impe, J. (2024). Optimal Experimental Design for (Semi-)Batch Crystallization Processes. In: Computer Aided Chemical Engineering: vol. 53, (805-810). Presented at the 34th European Symposium on Computer Aided Process Engineering / 15th International Symposium on Process Systems Engineering, Florence, Italy, 02 Jun 2024-06 Jun 2024. ISBN: 978-0-443-33897-7. doi: 10.1016/B978-0-443-28824-1.50135-6
- Wang, J., Hashem, I., Bhonsale, S.S., Van Impe, J. (2024). Vulnerability of Microbial Communities to Dishonest Signals: A biology driven complexity reduced model. In: Computer Aided Chemical Engineering: vol. 53, (769-774). Presented at the 34th European Symposium on Computer -Aided Process Engineering and the 15th International Symposium on Process Systems Engineering (PSE), Florence, Italy, 02 Jun 2024-06 Jun 2024. doi: 10.1016/B978-0-443-28824-1.50129-0
- Lunardon Quillo, G., Van Impe, J., Collas, A., Xiouras, C., Bhonsale, S. (2023). Dynamic Optimization of Active Pharmaceutical Ingredient (Semi-)Batch Crystallization using Population Balance Modelling. In: Computer Aided Chemical Engineering: vol. 52, (1495-1500). Presented at the ESCAPE 33, Athens, 18 Jun 2023-21 Jun 2023. ISBN: 9780443152757. doi: 10.1016/B978-0-443-15274-0.50238-9
- Katsini, L., Bhonsale, S., Roufou, S., Griffin, S., Valdramidis, V., Polanska, M., Van Impe, J. (2023). Spatio-temporal analysis of milk safety under climate change. In: Computer Aided Chemical Engineering: vol. 52, (Paper No. 2655-2660). Presented at the 33rd European Symposium of Computer Aided Process Engineering (ESCAPE-33), Athens, Greece. doi: 10.1016/B978-0-443-15274-0.50422-4
- Lapiedra Carrasquer, P., Bhonsale, S., Liang, L., Van Impe, J. (2023). Residence Time Distribution characterization in a Continuous Manufacturing tableting line using PCA and PLS-DA modeling. In: Computer Aided Chemical Engineering: vol. 52, (1771-1776). Presented at the 33rd European Symposium on Computer Aided Process Engineering, Athens, Greece. doi: 10.1016/B978-0-443-15274-0.50281-X
- Mores, W., Bhonsale, S., Logist, F., Van Impe, J. (2023). Multi-objective optimisation of the algae *Arthrospira platensis* under uncertainty: a Pareto ellipsoids approach. In: Computer Aided Chemical Engineering: vol. 52, (1071-1076). Presented at the 33rd European Symposium on Computer-Aided Process Engineering (ESCAPE-33), Athens. ISBN: 978-0-443-15274-0. doi: 10.1016/B978-0-443-15274-0.50171-2
- Bhonsale, S.S., Descamps, M., Sbarciog, M., Sopasakis, P., Van Impe, J. (2022). Risk Averse Model Predictive Control of Bioreactors. In: IFAC-PapersOnLine: vol. 55 (7), (933-938). Presented at the IFAC Symposium on Dynamics and Control of Process Systems (DYCOPS), Busan, Republic of Korea, 14 Jun 2022-17 Jun 2022. doi: 10.1016/j.ifacol.2022.07.563
- Bhonsale, S.S., Stokbroekx, B., Van Impe, J. (2019). Uncertainty Propagation for population balance model of a cone mill. In: Proceedings of International Conference on Particle Technology, (244-245). Presented at the PARTEC 2019, Nuremberg, Germany, 09 Apr 2019-11 Apr 2019.

Presentations and posters

- Katsini, L., Bhonsale, S., Roufou, S., Griffin, S., Valdramidis, V., Akkermans, S., Polanska, M., Van Impe, J. (2023). Predictive Modelling of Maltese Raw Milk Production Traits under Climate Dynamics. Presented at the IAFP's European Symposium on Food Safety, Aberdeen.
- Roufou, S., Katsini, L., Silva, C., Griffin, S., Bhonsale, S., Polanska, M., Van Impe, J., Valdramidis, V. (2022). Assessing the impact of climatic factors on the quality and safety of raw milk. Presented at the 36th EFFoST International Conference, Dublin, Ireland, 07 Nov 2022-09 Nov 2022.

- Katsini, L., Bhonsale, S., Roufou, S., Griffin, S., Valdramidis, V., Akkermans, S., Polanska, M., Van Impe, J. (2022). Predicting milk contamination under climate change scenarios. Presented at the 36th EFFoST International Conference, Dublin, Ireland.
- Malliaroudaki, M.I., Watson, N., Glover, Z., Katsini, L., Bhonsale, S., Van Impe, J., Nchari, L., Ferrari, R., Gomes, R. (2022). Driving towards a net-zero carbon dairy sector under climate change: Modelling energy use for dairy manufacturing and distribution. Presented at the 36th EFFoST International Conference, Dublin, Ireland, 07 Nov 2022-09 Nov 2022.
- Mores, W., Bhonsale, S.S., Hashem, I., Nimmegeers, P., Van Impe, J. (2022). A Pareto ellipsoids based algorithm for multiobjective optimisation under parametric uncertainty. (192-192). Presented at the Benelux Meeting on Systems and Control, Brussels, Belgium, 05 Jul 2022-07 Jul 2022.
- Katsini, L., Bhonsale, S., Munoz López, C.A., Roufou, S., Griffin, S., Valdramidis, V., Akkermans, S., Polanska, M., Van Impe, J. (2022). Assessment of microbial food safety risks due to climate change. Presented at the 41st Benelux Meeting on Systems and Control, Brussels, Belgium, 05 Jul 2022-07 Jul 2022.
- Bhonsale, S.S., Mores, W., Van Impe, J. (2022). Towards advanced model based control of bioprocesses. (166-166). Presented at the Benelux Meeting on Systems and Control, Brussels, Belgium, 05 Jul 2022-07 Jul 2022.
- Lapiedra Carrasquer, P., Muñoz López, C.A., Bhonsale, S., Van Impe, J. (2022). Determination of Residence Time Distribution in Continuous Manufacturing line using data driven modeling. Presented at the 41st Benelux Meeting on Systems and Control, Brussels, 05 Jul 2022-07 Jul 2022. (URL)
- Lunardon Quillo, G., Bhonsale, S., Collas, A., Xiouras, C., Van Impe, J. (2022). Fractional-Step Method in Population Balance Modelling of Combined Cooling-Antisolvent Pharmaceutical Crystallization Processes. Presented at the PBM 2022, Lyon.
- Bhonsale, S.S., Muñoz López, C.A., Mores, W., Van Impe, J. (2021). Computer Aided Food Engineering – CAFE for production and advanced data analytics for the “Perfect Pintje”. In: Proceedings of the EFFoST International Conference 2021. Presented at the 35th EFFoST International Conference, Lausanne, Switzerland, 01 Nov 2021-04 Nov 2021.
- Katsini, L., Muñoz López, C.A., Bhonsale, S.S., Akkermans, S., Polanska, M., Roufou, S., Valdramidis, V., Van Impe, J. (2021). Forecasting Cow Milk Microbial Safety and Quality based on Climatic Dynamics. Presented at the SfAM webinar series: Sustainable Microbiology – the future of combatting climate change, Online.
- Katsini, L., Muñoz López, C.A., Bhonsale, S., Akkermans, S., Polanska, M., Roufou, S., Griffin, S., Valdramidis, V., Van Impe, J. (2021). Data-driven modelling for the effect of climate on raw cow milk production traits: the Maltese case study. Presented at the e-agrostat2021: Days of the agro-industry group of the SFdS, Online.
- Lunardon Quillo, G., Bhonsale, S., Gielen, B., Collas, A., Xiouras, C., Van Impe, J. (2021). Towards a rigorous representation of API crystallization kinetics for enabling advanced analysis and comparison. Presented at the International Symposium on Industrial Crystallization - ISIC 2021, Online, 30 Aug 2021-02 Sep 2021.
- Bhonsale, S.S., Muñoz López, C.A., Van Impe, J. (2019). On the influence of Discrete Element Model Parameters using Global Sensitivity Analysis. Presented at the CAPE Forum 2019, Liege, Belgium, 24 Nov 2019-26 Nov 2019.
- De Buck, V., Muñoz López, C.A., Braeckman, J., Bhonsale, S., Van Impe, J. (2019). Multi-objective Optimisation without Coding: Introducing a Graphical User-Interface (GUI) for INPROP. Presented at the CAPE Forum 2019, Liège (BE), 24 Nov 2019-26 Nov 2019.
- Muñoz López, C.A., Bhonsale, S., Van Impe, J. (2019). Modelling a spray drying unit in the production of Active Pharmaceutical Ingredients(API). Combining first principles and data driven modeling. Presented at the CAPE Forum 2019, Liege, Belgium, 24 Nov 2019-25 Nov 2019.
- Bhonsale, S.S., Stokbroekx, B., Van Impe, J. (2019). On the identifiability of population balance model for air jet mills. In: 6th European Symposium on Comminution and Classification: book of extended

abstracts, (67-68). Presented at the European Symposium on Comminution and Classification, Leeds, UK, 02 Sep 2019-04 Sep 2019. doi: 10.5518/100/17

- Joseph, J.A., Bhonsale, S.S., De Kinder, T., De Buck, V., Van Impe, J. (2019). Towards multiscale modeling of *S. cerevisiae* by reducing the complexity of the metabolic network. Presented at the Specialized Conference on Sustainable Viticulture, Winery Wastes & Agro-industrial Wastewater Management, Mons, Belgium, 03 Jul 2019-05 Jul 2019.
- Bhonsale, S.S., De Buck, V., Joseph, J.A., Van Impe, J. (2019). Optimal Control of Beer Fermentation Process using POMODORO. In: Proceedings of Specialized Conference on Sustainable Viticulture, Winery Wastes & Agro-industrial Wastewater Management. Presented at the Specialized Conference on Sustainable Viticulture, Winery Wastes & Agro-industrial Wastewater Management, Mons, Belgium, 03 Jul 2019-05 Jul 2019.
- Bhonsale, S.S., Stokbroekx, B., Van Impe, J. (2019). On the solution of Population Balance Models for pure breakage in continuous systems using sectional methods. Presented at the Young Professionals Conference on Process Engineering, Magdeburg, Germany, 18 Mar 2018-20 Mar 2018.
- De Buck, V., Muñoz López, C.A., Hashem, I., Bhonsale, S., Van Impe, J. (2019). Towards interactive genetic algorithms: Introducing a novel trade-off based selection and stopping criterion. Presented at the YCOPE 2019, Magdeburg (DE), 18 Mar 2019-20 Mar 2019.
- Bhonsale, S.S., Telen, D., Stokbroekx, B., Van Impe, J. (2018). Towards Modeling And Control Of Spiral Jet Mills: A Population Balance Approach. Presented at the Population Balance Modeling Conference, Ghent, 06 May 2018-09 May 2018.
- Bhonsale, S., Nimmegeers, P., Perrotta, D., Telen, D., Van Impe, J. (2017). Combined State Estimation and Predictive Control of Biological Systems using SolACE. Presented at the International conference on Predictive Modelling in Food, Cordoba, Spain, 26 Sep 2017-29 Sep 2017.
- Bhonsale, S., Telen, D., Stokbroekx, B., Van Impe, J. (2017). Identifiability Analysis of Population Balance Model for Spiral Air Jet Mill. In: Book of Abstracts of 36th Benelux Meeting on Systems and Control. Presented at the Benelux Meeting on Systems and Control, Spa, Belgium, 28 Mar 2017-30 Mar 2017.
- Nimmegeers, P., Telen, D., Bhonsale, S., Hashem, I.G H M., Van Impe, J. (2016). An interactive computer aided decision making tool for sustainable food production and processing. Presented at the EFFoST International Conference, Vienna (Austria), 28 Nov 2016-30 Nov 2016.

RESEARCH SUPERVISION & MENTORING

Doctoral Candidates (Co-Supervised)

- Lydia Katsini: Modelling effect of climate change in food safety (MSCA-ITN PROTECT 813329). 2020–2025. *Defended*.
- Gustavo Lunardon Quillo: Modelling and control of crystallisation processes (VLAIO-Baekeland HBC.2020.2214). 2020–2026. *Defended*.
- Pau Lapiedra Carrasquer: Data-driven modelling of continuous manufacturing processes (VLAIO-Baekeland HBC.2022.0177). 2021 – ongoing.
- Wannes Mores: Metabolic network reduction for bioprocess optimisation and control (FWO 1SHG124N). 2021 – ongoing.
- Jian Wang: Biology-driven complexity reduction of individual-based models (MSCA-ITN E-MUSE 956126). 2022 – ongoing.
- Francisca Pizarro Galleguillos: Risk-averse optimisation of multiscale models (MSCA-DN FAIROmics 101120449). 2024 – ongoing.
- Stylianos Floros: Modelling microbial community in human gut. 2024 – ongoing.
- Pratham Kapavarapu: Designing optogenetic control systems for cyanobacteria. 2024 – ongoing.

PhD Examination Committees

- Ihab Hashem (KU Leuven, 2022): Unravelling biofilm formation and removal dynamics
- Carlos Andre Muñoz López (KU Leuven, 2024): Integrated process monitoring and control of API production via tensor-based data-driven modelling.
- Viviane De Buck (KU Leuven, 2025): Robust model predictive control of bioprocesses via multi-objective optimisation.

Master's Students

- >20 MSc theses (co-)supervised across KU Leuven (Bio)chemical Engineering and Erasmus Mundus Food4S programmes.

TEACHING EXPERIENCE

Course Responsibility & Co-Teaching

- B-KUL-JPI1A6 Computational Food Science, Technology, and Engineering: Fundamentals: Erasmus Mundus Food4S, KU Leuven. Co-developed syllabus and teach (3 weeks, full-time). 2020 – present.
- B-KUL-JPI0VO Computational Food SET: Supplements: Erasmus Mundus Food4S, KU Leuven. Co-developed and teach. 2020 – present.
- B-KUL-JPI0TM Systems Analysis and Process Control: Multi-campus MSc (Bio)chemical Engineering, KU Leuven. 2018 – 2020.
- Parameter Estimation in Predictive Microbiology: Erasmus Mundus Food4S. 2017 – 2020.

Summer Schools / Invited Teaching

- Invited lecturer at summer schools in Malta, Spain, and Hungary on modelling, parameter estimation, process control, reinforcement learning.

Curriculum Development

- Co-drafted syllabi for two computational modules of the Erasmus Mundus Food4S programme (www.food4s.eu).
- Contributor to CBHE FIND4S project with 7 Indonesian universities: pedagogy and curriculum exchange.

ACADEMIC SERVICE & LEADERSHIP

Conference Organisation

- Co-Chair, Local Organising Committee: ESCAPE 35, Ghent (2025; ~730 participants). Managed abstract/paper review and ranking; oversaw on-site logistics and volunteers; co-edited proceedings (423 full papers in PSE Press Systems & Control Transactions; 140 short papers, EUROSIS).
- Local Organising Committee: FoodSIM 2020, 2022, 2024, 2026 (~80–90 participants).
- International Scientific Committee: FoodSim, Industrial Simulation Conference, ESCAPE, MATHMOD.

Peer Review

- Regular reviewer: IEEE Transactions on Automatic Control; Powder Technology; Computers & Chemical Engineering; Chemical Engineering Science; Bioinformatics; Fermentation; Frontiers in Chemical Engineering; Biochemical Engineering Journal; Processes; and others.

Departmental & University Service

- BAP Representative, Department of Chemical Engineering, KU Leuven.

INVITED TALKS & KEYNOTES

- Scientific Machine Learning for Biological Systems, FOODSIM, KU Leuven, April 2026
- Uncertainty: Its Quantification, Mitigation, Propagation and Decision Making, Industrial Simulation Conference, Universitat Politècnica de Valencia, June 2024.

REFERENCES

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Email: jpico@ai2.upv.es
Phone: +34 606 615 756
- **Dr. Alain Collas, Janssen Pharmaceutica (Johnson & Johnson), Belgium**
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