



European Training Network for Resource Recovery Through Enhanced Landfill Mining (NEW-MINE)

D6.2 Second paper by ESR1-15



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Public

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[All ESRs;

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Introduction

The European Training Network for Resource Recovery Through Enhanced Landfill Mining (NEW-MINE) is laying the foundations for a resource- and environmentally driven ELFM industry in the EU, through the development of innovative concepts, technologies and methods for integrated resource recovery and remediation of landfills containing municipal solid waste (MSW). More specifically, ELFM refers to the value-chain of exploring, excavating, separating, treating, recovering and upcycling landfilled materials and energy resources as well as reclaiming the land that the landfills currently occupy.

The NEW-MINE project kicked off in September 2016 and unites a team of 15 young, enthusiastic PhD researchers across the E.U. working on resource recovery through enhanced landfill mining. Every six months, the full consortium gathers during a Network-Wide Event (NWE) in which the Early Stage Researchers (ESRs) present their results of the past months. Feedback is provided by (co-)supervisors, partners and peers, and the perspectives towards the future are discussed. Furthermore, during these NWEs, the ESRs discuss the academic work (conference posters, presentations, and journal papers).

Below an overview is given of all publications per ESR until July 16, 2020. Some papers are co-authors by different ESRs and are therefore mentioned with all involved ESRs. Both published and upcoming journal articles and conference papers are mentioned. It should be considered that the different ESRs have a different starting date of their individual PhDs and therefore have progressed to different levels. All final publications are open access and available in online open repositories; they are also listed on the project website under 'Communications' – 'Science communication': <https://new-mine.eu/communications/science-communication/>

Overview publications

ESR1 - Christin Bobe (UGent) - Modelling the landfill subsurface through integration of multi-sensor geophysical data, WP1

Thesis

Bobe, C. (2020). *Efficient probabilistic processing of frequency-domain electromagnetic data for subsurface modelling*. Universiteit Gent. Faculteit Bio-ingenieurswetenschappen.

Peer-reviewed journal papers (first author)

Bobe, C., Van De Vijver, E., Keller, J., Hanssens, D., Van Meirvenne, M., & De Smedt, P. (2020). Probabilistic 1-D inversion of frequency-domain electromagnetic data using a Kalman ensemble generator. *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*, 58(5), 3287–3297.

Peer-reviewed journal papers (not first author)

Vollprecht, D., Bobe, C., Stiegler, R., Van De Vijver, E., Wolfsberger, T., Küppers, B., & Scholger, R. (2019). Relating magnetic properties of municipal solid waste constituents to iron content : implications for enhanced landfill mining. *DETRITUS*, 8, 31–46.



Hanssens, Daan, Delefortrie, S., Bobe, C., Hermans, T., and De Smedt, P. (2019). Improving the reliability of soil EC-mapping: robust apparent electrical conductivity (rECa) estimation in ground-based frequency domain electromagnetics. *GEODERMA*, 337, 1155â€“1163.

Delefortrie, S., Hanssens, D., Saey, T., Van De Vijver, E., Smetryns, M., Bobe, C., and De Smedt, P. (2019). Validating land-based FDEM data and derived conductivity maps: Assessment of signal calibration, signal attenuation and the impact of heterogeneity. *Journal of Applied Geophysics*, 164, 179-190.

Submitted publications

Bobe, C., Keller, J., and Van De Vijver, E., Sensitivity and depth of investigation from Monte Carlo ensemble statistics. *Submitted to Geophysical Prospecting*.

Bobe, C., Hanssens, D., Hermans, T., and Van De Vijver, E., Efficient probabilistic joint inversion of direct current resistivity and electromagnetic induction data. *Submitted to Algorithms*.

Peer-reviewed conference papers

Bobe, C., and Van De Vijver, E. (2019). Offset errors in probabilistic inversion of small-loop frequency-domain electromagnetic data: a synthetic study on their influence on magnetic susceptibility estimation, International workshop on Gravity, Electrics and Magnetics 2019, Xi'an, China.

Bobe, C., Van De Vijver, E., and Van Meirvenne, M. (2018). Exploring the potential of electromagnetic surface measurements for the characterization of industrial landfills. In Proceedings of the 4th international symposium on enhanced landfill mining, pages 45–50. KU Leuven. Sustainable Inorganic Materials Management; i-Cleantech.

Abstracts

Bobe, C., Hanssens, D., De Smedt, P., and Van De Vijver, E. (2019). Efficient probabilistic joint inversion using a Kalman ensemble generator. Abstract 581766-S017, 2019 Fall Meeting, AGU, San Francisco, Calif., 9.-13. Dec.

Bobe, C., Van De Vijver, E., and Van Meirvenne, M. (2019). Proposing a statistical interpretation for the depth of investigation. *GEOPHYSICAL RESEARCH ABSTRACTS* (Vol. 21). Presented at the EGU General Assembly 2019.

Bobe, C., Van De Vijver, E., and Van Meirvenne, M. (2019). Improving geophysical resource exploration using probabilistic inversion methods. *COMMUNICATIONS IN AGRICULTURAL AND APPLIED BIOLOGICAL SCIENCES* (Vol. 84, pp. 9-9). Presented at the 24th National symposium for Applied Biological Sciences (NSABS 2019).

Bobe, C., Van De Vijver, E., De Smedt, P., Hanssens, D., and Van Meirvenne, M. (2018). Bayesian inversion of loop-loop electromagnetic data using an ensemble Kalman method. In *GEOPHYSICAL RESEARCH ABSTRACTS*, volume 20.



ESR2 - Cristina Gloria García Lopez (RWTH Aachen) - Validation and expansion of the geophysical model by mechanical processing (RWTH), WP1

Journal papers (peer-reviewed) published:

1. C. García López, A. Ni, J.C. Hernández Parrodi, B. Küppers, K. Raulf and T. Pretz, "Characterization of landfill mining material after ballistic separation to evaluate material and energy recovery potential". Detritus Journal, Special Issue: Enhanced Landfill mining, September 2019. DOI [10.31025/2611-4135/2019.13780](https://doi.org/10.31025/2611-4135/2019.13780)
2. C. García López, B. Küppers, J.C. Hernández Parrodi, A. Clausen, T. Pretz. "Landfill mining: A case study on sampling, processing and characterization of excavated waste from an Austrian landfill". Detritus Journal, Volume 02, June 2018. DOI [10.31025/2611-4135/2018.13664](https://doi.org/10.31025/2611-4135/2018.13664)
3. I. Nuran Zaini, C. García López, T. Pretz, P. Göran Jönsson and W. Yang, "Characterization of pyrolysis products of high-ash excavated-waste and its char gasification reactivity and kinetics under a steam atmosphere". Waste Management, August 2019. DOI <https://doi.org/10.1016/j.wasman.2019.08.001>
4. B. Küppers, J.C. Hernández Parrodi C. García López, D. Vollprecht and R. Pomberger, "Potential of Sensor-Based Sorting in Enhanced Landfill Mining". Detritus Journal, Special Issue: Enhanced Landfill mining, September 2019. DOI [10.31025/2611-4135/2019.13875](https://doi.org/10.31025/2611-4135/2019.13875)
5. J.C. Parrodi, C. García López, B. Küppers, K. Raulf, D. Vollprecht, T. Pretz and R. Pomberger, "Case study on enhanced landfill mining at Mont-Saint-Guibert landfill in Belgium: Characterization and potential of fine fractions". Detritus Journal, Special Issue: Enhanced Landfill mining, September 2019. DOI [10.31025/2611-4135/2019.13877](https://doi.org/10.31025/2611-4135/2019.13877)
6. H. Lucas, J. C. Hernández Parrodi, C. García López, D. Vollprecht, K. Raulf, R. Pomberger, T. Pretz and B. Friedrich, "Assessment of the recovery of non-ferrous metals in landfill mining. A case study of a landfill in Belgium". Detritus Journal, Special Issue: Enhanced Landfill mining, September 2019. DOI [10.31025/2611-4135/2019.13879](https://doi.org/10.31025/2611-4135/2019.13879)

Conference papers published:

1. Nuran Zaini, C. García López, Y. Gómez Rueda, T. Pretz, L. Helsen, P. Göran Jönsson and W. Yang, "Gasification of refuse derived fuel obtained from a ballistic separation process of landfill waste". At the 17th International waste management and landfill Symposium (Sardinia, Italy), October 2019
2. C. García López, B. Küppers, K. Raulf, T. Pretz, D. Vollprecht, R. Pomberger, "Applicability of Sensor-Based Sorting to Landfill Mining Material" At the World Congress ISWA (Bilbao, Spain), October 2019
3. H. Lucas, C. Li, C. García López, J. C. Hernández Parrodi, D. Gürsel, B. Friedrich, T. Pretz and H. Wotruba, "Primary evaluation of the use and refining of Al scrap recovered from a landfill in Belgium". At the European Metallurgical Conference (Düsseldorf, Germany), June 2019
4. J.C. Parrodi, C. García López, B. Küppers, D. Vollprecht and R. Pomberger. "Characterization of Fine Fractions from Landfill Mining - A Case Study of a Landfill Site in Belgium". At Recy and DepoTech 2018 (Leoben, Austria), November 2018
5. C. García López, A. Ni, J.C. Parrodi Hernández, B. Küppers, A. Clausen and T. Pretz. "Characterization of landfill mining material after ballistic separation to evaluate material and energy recovery". At the Urban Mining Symposium (Bergamo, Italy), May 2018
6. C. García López, A. Clausen and T. Pretz. "Potential of the ballistic separator Type STT6000 as a first step for the recovery of RDF from old landfill material: A case study at Mont Saint Guibert Landfill (Belgium)". At the 4th Enhanced Landfill Mining Symposium (Mechelen, Belgium), February 2018



7. Clausen, C. García López, M. Kriipsalu and T. Pretz, “MSW management in Estonia: The current situation and future potential for energy recovery from sustainable sources”. At the International Symposium on MBT and MRF (**Hannover, Germany**), May 2017
8. Küppers, C. García López, D. Vollprecht, A. Clausen and R. Pomberger. “Das “EU Training Network for Resource Recovery through Enhanced Landfill Mining” (NEW-MINE)”. At the 7. Wissenschaftskongress “Abfall- und Ressourcenwirtschaft” (**Aachen, Germany**), March 2017

ESR3 - Bastian Küppers (MULEoben) - Modelling and validation of sensor-based sorting technologies of intergrown and surface-defiled waste, WP1

Peer-review papers published:

García López C, **Küppers B**, Clausen A, Pretz T (2018) LANDFILL MINING: A CASE STUDY REGARDING SAMPLING, PROCESSING AND CHARACTERIZATION OF EXCAVATED WASTE FROM AN AUSTRIAN LANDFILL. In: Detritus. DOI: 10.31025/2611-4135/2018.13664

García López C, Ni A, Hernández Parrodi JC, **Küppers B**, Raulf K, Pretz T (2019) CHARACTERIZATION OF LANDFILL MINING MATERIAL AFTER BALLISTIC SEPARATION TO EVALUATE MATERIAL AND ENERGY RECOVERY POTENTIAL. Detritus. DOI: 10.31025/2611-4135/2019.13780

Küppers B, Schloegl S, Oreski G, Pomberger R, Vollprecht D (2019) Influence of surface roughness and surface moisture of plastics on sensor-based sorting in the near infrared range. In: Waste Management & Research. DOI: 10.1177/0734242X19855433

Küppers B, Chen X, Seidler I, Friedrich K, Raulf K, Pretz T, Feil A, Pomberger R, Vollprecht D (2019) INFLUENCES AND CONSEQUENCES OF MECHANICAL DELABELLING ON PET RECYCLING. In: Detritus. DOI: 10.31025/2611-4135/2019.13816

Pfandl K, **Küppers B**, Scheiber S, Stockinger G, Holzer J, Pomberger R, Antrekowitsch H, Vollprecht D (2019) X-ray fluorescence sorting of non-ferrous metal fractions from municipal solid waste incineration bottom ash processing depending on particle surface properties. Waste Management & Research. DOI: 10.1177/0734242X19879225

Vollprecht D, Bobe C, Stiegler R, Van De Vijver E, Wolfsberger T, **Küppers B**, Scholger R (accepted) Relating magnetic properties of municipal solid waste constituents to iron content – Implications for enhanced landfill mining. In: Detritus.

Hernández Parrodi JC, García López C, **Küppers B**, Raulf K, Vollprecht D, Pretz T, Pomberger R (accepted) CASE STUDY ON ENHANCED LANDFILL MINING AT MONT-SAINT-GUIBERT LANDFILL IN BELGIUM: CHARACTERIZATION AND POTENTIAL OF FINE FRACTIONS. In: Detritus.

Küppers B, Seidler I, Koinig G, Pomberger R, Vollprecht D (accepted) Influence of Throughput Rate and Input Composition on Sensor-Based Sorting Efficiency. Accepted by Detritus.

Küppers B, Hernández Parrodi JC, García López C, Pomberger R, Vollprecht, D (accepted) Potential of Sensor-Based Sorting in Enhanced Landfill Mining. Accepted by Detritus. DOI: 10.31025/2611-4135/2019.13875



Conference papers published:

Küppers B, García López C, Höllen D, Pomberger R, Clausen A, Pretz T (2017) Das „EU Training Network for Resource Recovery through Enhanced Landfill Mining“ (NEW-MINE). In: 7. Wissenschaftskongress Abfall- und Ressourcenwirtschaft

García López C, **Küppers B**, Höllen D, Clausen A, Pretz T (2017) Landfilled Materials Composition at the Landfill Site in Halbenrain (Austria). In: 5th International Conference on Sustainable Solid Waste Management – Athen

Pomberger R, **Küppers B** (2017) Entwicklungen in der sensorgestützten Sortiertechnik. In Österreichische Abfallwirtschaftstagung 2017

Küppers B, Muras A, Höllen D, Rothschedl R (2018) Landfill Mining of a Mixed Municipal Solid Waste and Commercial Waste Landfill: Application of Existing Processing Technology - Opportunities and Limitations. In: 4th International Symposium On Enhanced Landfill Mining

Vollprecht D, **Küppers B**, Pomberger R, Machiels L, Bernardo E, Krook J (2018) Das "EU Training Network for Resource Recovery Through Enhanced Landfill Mining (NEW-MINE). In: Recy & DepoTech Band 14

Hernández Parrodi JC, García López C, Raulf K, Pretz T, **Küppers B**, Vollprecht D, Pomberger R (2018) Characterization of Fine fractions from Landfill Mining – A Case Study of a Landfill Site in Belgium. In: Recy & DepoTech Band 14

Küppers B, Möllnitz S (2018) Versuchsstand für sensorgestützte Erkennung und Sortierung. In: 8. Wissenschaftskongress „Abfall- und Ressourcenwirtschaft“

Küppers B, Vollprecht D, Pomberger R (2018) Einfluss von Verschmutzungen auf die sensorgestützte Sortierung. In: Recy & DepoTech Band 14

Küppers B (2019) Möglichkeiten einer sensorgestützten Sortierung von Kunststoffabfällen – Der Einfluss von Verunreinigungen. In: ÖWAV Seminar Wertstoff Kunststoff, Kunststoffrecycling – Quoten und Herausforderungen

Küppers B, Vollprecht D, Pomberger R (2019) Einsatz sensorgestützter Sortierverfahren im Landfill Mining. In: Berliner Konferenz Mineralische Nebenprodukte und Abfälle: Aschen, Schlacken, Stäube, Baurestmassen. Band 6

Küppers B, Schlögl S, Friedrich K, Lederle L, Pichler C, Freil J, Pomberger R, Vollprecht D (2020) Correlations between Input Composition, Throughput Rate and Sorting Efficiency. In: Sensor-Based Sorting & Control (submitted)

ESR4 - Juan Carlos Hernandez Parrodi (Renewi) - Production of Refuse Derived Fuel from presently inappropriate waste fractions, WP1

Conference papers

Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2017. Characterization of Fine Fractions from Landfill Mining: A Review of Previous Landfill Mining Investigations, in: Proceedings of the 16th International Waste Management and Landfill Symposium. 16th International Waste



Management and Landfill Symposium (Sardinia 2017), Cagliari, Italy. 5-9 October. CISA Publisher, Padova, Italy.

Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2018. Fine Fractions from Landfill Mining: Potential and Main Challenges to Overcome, in: Proceedings of the 4th International Symposium on Enhanced Landfill Mining (ELFM IV). 4th International Symposium on Enhanced Landfill Mining (ELFM IV), Mechelen, Belgium. 5-6 February, Leuven, Belgium, pp. 51–64.

García López, C., **Hernández Parrodi, J.C.**, Küppers, B., Pretz, T., 2018. The Potential of the Ballistic Separator Type STT6000 as a First Step for the Recovery of Refuse Derived Fuel from Landfill Material: A Case Study at Mont-Saint-Guibert Landfill (Belgium), in: Proceedings of the 4th International Symposium on Enhanced Landfill Mining (ELFM IV). 4th International Symposium on Enhanced Landfill Mining (ELFM IV), Mechelen, Belgium. 5-6 February, Leuven, Belgium, pp. 113–120.

García López, C., Ni, A., **Hernández Parrodi, J.C.**, Küppers, B., Pretz, T., 2018. Characterization of Landfill Mining Material after Ballistic Separation to Evaluate Material and Energy Recovery, in: Proceedings of the 4th Symposium on Urban Mining and Circular Economy. 4th Symposium on Urban Mining and Circular Economy (SUM2018), Bergamo, Italy. 21-23 May. CISA Publisher, Padova, Italy.

Hernández Parrodi, J.C., García López, C., Raulf, K., Pretz, T., Küppers, B., Höllen, D., Pomberger, R., 2018. Characterization of Fine Fractions from Landfill Mining - A Case Study of a Landfill Site in Belgium, in: Vorträge-Konferenzband zur 14. Recy & DepoTech-Konferenz. Recy & DepoTech 2018, Leoben, Austria. 7-9 November. Montanuniversität Leoben, Lehrstuhl für Abfallverwertungstechnik und Abfallwirtschaft (AVAW), Leoben, Austria, pp. 569–576.

Lucas, H., Li, C., García López, C., **Hernández Parrodi, J.C.**, Gürsel, D., Friedrich, B., Pretz, T., Wotruba, H., 2019. Primary Evaluation of the Use and Refining of Al Scrap Recovered from a Landfill in Belgium, in: Proceedings of the 10th European Metallurgical Conference 2019. European Metallurgical Conference (EMC 2019), Düsseldorf, Germany. 23-26 June. GDMB, Clausthal-Zellerfeld, Germany, pp. 51–64.

Hernández Parrodi, J.C., Raulf, K., Vollprecht, D., Pretz, T., Pomberger, R., 2019. Mechanical Processing of Fine Fractions from Landfill Mining for Material and Energy Recovery, in: Proceedings of the 17th International Waste Management and Landfill Symposium. 17th International Waste Management and Landfill Symposium (Sardinia 2019), Cagliari, Italy. 30 September - 4 October. CISA Publisher, Padova, Italy.

Hernández Parrodi, J.C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J.L., Einhäupl, P., 2019. Strategies for Landfill Mining - Integrating Resource Recovery into Waste Management, in: Proceedings of the 17th International Waste Management and Landfill Symposium. 17th International Waste Management and Landfill Symposium (Sardinia 2019), Cagliari, Italy. 30 September - 4 October. CISA Publisher, Padova, Italy.

Journal articles

Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2018. Characterization of Fine Fractions from Landfill Mining: A Review of Previous Investigations. *Detritus* 2 (1), 46–62. 10.31025/2611-4135/2018.13663.



Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2018. Potential and Main Technological Challenges for Material and Energy Recovery from Fine Fractions of Landfill Mining: A Critical Review. *Detritus* 3 (1), 19–29. 10.31025/2611-4135/2018.13689.

Garcia Lopez, C., Ni, A., **Hernández Parrodi, J.C.**, Küppers, B., Raulf, K., Pretz, T., 2019. Characterization of Landfill Mining Material after Ballistic Separation to Evaluate Material and Energy Recovery Potential. *Detritus* 8 (1), 5–23. 10.31025/2611-4135/2019.13780.

Küppers, B., **Hernández Parrodi, J.C.**, Garcia Lopez, C., Pomberger, R., Vollprecht, D., 2019. Potential of Sensor-based Sorting in Enhanced Landfill Mining. *Detritus* 8 (1), 24–30. 10.31025/2611-4135/2019.13875.

Hernández Parrodi, J.C., Garcia Lopez, C., Küppers, B., Raulf, K., Vollprecht, D., Pretz, T., Pomberger, R., 2019. Case Study on Enhanced Landfill Mining at Mont-Saint-Guibert Landfill in Belgium: Characterization and Potential of Fine Fractions. *Detritus* 8 (1), 47–61. 10.31025/2611-4135/2019.13877.

Hernández Parrodi, J.C., Raulf, K., Vollprecht, D., Pretz, T., Pomberger, R., 2019. Case Study on Enhanced Landfill Mining at Mont-Saint-Guibert Landfill in Belgium: Mechanical Processing of Fine Fractions for Material and Energy Recovery. *Detritus* 8 (1), 62–78. 10.31025/2611-4135/2019.13878.

Lucas, H.I., Garcia Lopez, C., **Hernández Parrodi, J.C.**, Vollprecht, D., Raulf, K., Pomberger, R., Pretz, T., Friedrich, B., 2019. Quality Assessment of Nonferrous Metals Recovered from Landfill Mining: A Case Study in Belgium. *Detritus* 8 (1), 79–90. 10.31025/2611-4135/2019.13879.

Hernández Parrodi, J.C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J.L., Einhäupl, P., Vollprecht, D., Pomberger, R., Friedrich, B., Van Acker, K., Krook, J., Svensson, N., Van Passel, S., 2019. Integration of Resource Recovery into Current Waste Management through (Enhanced) Landfill Mining. *Detritus* 8 (1), 141–156. 10.31025/2611-4135/2019.13884.

Hernández Parrodi, J.C., Vollprecht, D., Pomberger, R., 2020. Case Study on Enhanced Landfill Mining at Mont-Saint-Guibert Landfill in Belgium: Physico-chemical Characterization and Valorization Potential of Combustibles and Inert Fractions Recovered from Fine Fractions. *Detritus*, In press. 10.31025/2611-4135/2020.13941.

Vollprecht, D., **Hernández Parrodi, J.C.**, Lucas, H., Pomberger, R., 2020. Case Study on Enhanced Landfill Mining at Mont-Saint-Guibert Landfill in Belgium: Mechanical Processing, Physico-chemical and Mineralogical Characterisation of Fine Fractions <4.5 mm. *Detritus*, In press. 10.31025/2611-4135/2020.13940.

Conference presentations

Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2018. Fine Fractions from Landfill Mining: Potential and Main Challenges to Overcome. 4th International Symposium on Enhanced Landfill Mining (ELFM IV), Mechelen, Belgium. 5-6 February.

García López, C., Ni, A., **Hernández Parrodi, J.C.**, Küppers, B., Pretz, T., 2018. Characterization of Landfill Mining Material after Ballistic Separation to Evaluate Material and Energy Recovery. 4th Symposium on Urban Mining and Circular Economy (SUM2018), Bergamo, Italy. 21-23 May.



Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2018. Characterization of Fine Fractions from Landfill Mining – A Case Study of a Landfill Site in Belgium. Recy & DepoTech 2018, Leoben, Austria. 7-9 November.

Lucas, H., Li, C., García López, C., **Hernández Parrodi, J.C.**, Gürsel, D., Friedrich, B., Pretz, T., Wotruba, H., 2019. Primary Evaluation of the Use and Refining of Al Scrap Recovered from a Landfill in Belgium. 10th European Metallurgical Conference (EMC 2019), Düsseldorf, Germany. 23-26 June.

Hernández Parrodi, J.C., Raulf, K., Vollprecht, D., Pretz, T., Pomberger, R., 2019. Mechanical Processing of Fine Fractions from Landfill Mining for Material and Energy Recovery. 17th International Waste Management and Landfill Symposium (Sardinia 2019), Cagliari, Italy. 30 September - 4 October.

Hernández Parrodi, J.C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J.L., Einhäupl, P., 2019. Strategies for Landfill Mining - Integrating Resource Recovery into Current Waste Management. 17th International Waste Management and Landfill Symposium (Sardinia 2019), Cagliari, Italy. 30 September - 4 October.

Hernández Parrodi, J.C., Bobe, C., García López, C., Küppers, B., 2020. Innovative Landfill Exploration and Mechanical Processing. 5th International Symposium on Enhanced Landfill Mining (ELFM V), Leuven, Belgium. 6 February.

Posters

Hernández Parrodi, J.C., Höllen, D., Pomberger, R., 2017. Characterization of Fine Fractions from Landfill Mining: A Review of Previous Landfill Mining Investigations. 16th International Waste Management and Landfill Symposium (Sardinia 2017), Cagliari, Italy. 5-9 October.

García López, C., **Hernández Parrodi, J.C.**, Küppers, B., Clausen, A., Pretz, T., 2018. The Potential of the Ballistic Separator Type STT6000 as a First Step for the Recovery of RDF from Old Landfill Material: A Case Study at Mont-Saint-Guibert Landfill (Belgium). 4th International Symposium on Enhanced Landfill Mining (ELFM IV), Mechelen, Belgium. 5-6 February.

Ascensão, G., Bobe, C., García López, C., Küppers, B., **Hernández Parrodi, J.C.**, Zaini, I.N., Gomez Rueda, Y., Gigantino, M., Lucas, H., Flesoura, G., Rabelo Monich, P., Sauve, G., Esguerra, J.L., Einhäupl, P., 2018. A Holistic Enhanced Landfill Mining Project – The Value Chain of the NEW-MINE Training Network. ETN SOCRATES, ETN NEW-MINE & EIT Raw Materials SUMA Summer School: To Mine or Not to Mine? A Multi-criteria Assessment of the Landfill Mining of Municipal and Industrial Solid Waste Deposits, Leuven, Belgium. 10-12 September.

ESR5 - Ilman Nuran Zaini (KTH) - Sustainable Municipal Solid Waste treatment by a steam plasma gasification, WP2

Peer-review papers published:

1. Ilman Nuran Zaini, Weihong Yang, Pär Göran Jönsson, *Steam gasification of solid recovered fuel char derived from landfill waste: A kinetic study*, Energy Procedia, Volume 142, 2017, Pages 723-729, ISSN 1876-6102, <https://doi.org/10.1016/j.egypro.2017.12.118>.
2. Ilman Nuran Zaini, Cristina García López, Thomas Pretz, Weihong Yang, Pär Göran Jönsson. *Characterization of pyrolysis products of high-ash excavated-waste and its char gasification reactivity and kinetics under a steam atmosphere*, Waste Management, Volume 97, 2019, Pages 149-163, ISSN 0956-053X, <https://doi.org/10.1016/j.wasman.2019.08.001>.



Peer-review papers to be submitted:

1. Ilman Nuran Zaini, Yamid Gomez Rueda, Cristina García López, Devy Kartika Ratnasari, Lieve Helsen, Thomas Pretz, Pär Göran Jönsson, Weihong Yang, *Production of H₂-rich syngas from excavated landfill waste through a steam co-gasification with biochar*. Submitted to the *Journal of Energy* (under review after revision).
2. Ilman Nuran Zaini, Pär Göran Jönsson, Weihong Yang, *Fragmentation behavior of refuse derived fuel pellets during thermochemical conversion processes*. In preparation, to be submitted in July 2020.
3. Ilman Nuran Zaini, Pär Göran Jönsson, Weihong Yang, *Integrated drying, high temperature gasification, and plasma tar cracking for conversion of high-ash landfill waste*. In preparation, to be submitted in August 2020.

Conference papers published:

1. Ilman Nuran Zaini, Weihong Yang, Pär Göran Jönsson. *Pyrolysis of solid recovered fuel from landfill waste: Gas and oil product composition*, 4th International Symposium on Enhanced Landfill Mining, Mechelen (Belgium), 5-6 February 2018.
2. Ilman Nuran Zaini, Cristina García López, Thomas Pretz, Weihong Yang, Pär Göran Jönsson, *Gasification of refuse derived fuel obtained from a ballistic separation process of landfill waste*, 17th International Waste Management and Landfill Symposium, Cagliari (Sardinia, Italy), 30 Sept - 4 Oct 2019.

Conference papers submitted:

1. Ilman Nuran Zaini, Weihong Yang, Pär Göran Jönsson, *Energy and material recovery through plasma gasification of landfill waste*, Circular Materials Conference 2018, Gothenburg (Sweden), 7 – 8 March 2018. (Conference abstract)

Other scientific contributions within NEW-MINE:

1. Yamid Gomez-Rueda, **Ilman Nuran Zaini**, Weihong Yang, Lieve Helsen, *Thermal tar cracking enhanced by cold plasma -A study of naphthalene as tar surrogate*. Energy Conversion and Management, Volume 208, 15 March 2020, <https://doi.org/10.1016/j.enconman.2020.112540>.
2. Yamid Gomez-Rueda, **Ilman Nuran Zaini**, Weihong Yang, Lieve Helsen. *Landfill solid waste-based syngas purification by a hybrid pulsed corona plasma unit*. 27th European Biomass Conference and Exhibition, 27-30 May 2019, Lisbon, Portugal, 520–522, <https://doi.org/10.5071/27thEUBCE2019-2BO.6.2>
3. Yamid Gomez-Rueda, **Ilman Nuran Zaini**, Weihong Yang, Lieve Helsen. *Purification of syngas obtained from MSW using recycled calcined shells in a secondary tar cracking unit*. Submitted to the *Journal of Biomass and Bioenergy* (under review).
4. Katarzyna Jagodzinska, **Ilman Nuran Zaini**, Rikard Svanberg, Weihong Yang, Pär G Jönsson. *Pyrolysis of excavated waste - A comprehensive study on the process products*. Submitted to the *Journal of Cleaner Production* (under review).



ESR6 - Yamid Gomez Rueda (KU Leuven) - Syngas purification by plasma tar cracking, WP2**Peer-review papers published:**

1. Rueda, Y. G., & Helsen, L. (2019). The role of plasma in syngas tar cracking. *Biomass Conversion and Bio refinery*. <https://doi.org/10.1007/s13399-019-00461-x>. Status: Published Online.
2. Gomez Rueda Y., Nuran Zaini I., Yang W., Helsen L. HV Nanosecond-pulsed corona plasma for tar cracking at high temperatures using naphthalene as tar surrogate. *Energy conversion and management*. Status: Accepted. 2019.

Conference papers published:

3. Gomez Rueda, Y., Nuran Zaini, I., Yang, W., & Helsen, L. (2019). Landfill solid waste-based syngas purification by a hybrid pulsed corona plasma unit. 27th European Biomass Conference and Exhibition, 27-30 May 2019, Lisbon, Portugal, 520–522. <https://doi.org/10.5071/27thEUBCE2019-2BO.6.2>. Status: Published Online
4. Rueda, Y. G., Helsen, L. (2019). The use of a nanosecond-pulsed corona plasma for tar-cracking at high temperatures : first insights. 2–4. <https://www.ispc-conference.org/ispcproc/ispc24/493.pdf>. Status: Published Online
5. Gomez Rueda Y., Helsen L. Agon N.(2018). Cold plasmas for gaseous pollutant control as a benchmark for their use in tar abatement in syngas. https://kuleuven.sim2.be/wp-content/uploads/2018/02/ELFM-IV_Symposium_Book_FEB_2018.pdf. IV Enhanced Landfill Mining symposium. Status: Published
6. Gomez Rueda Y., Helsen L. (Accepted oral presentation). The effect of carbon dioxide and steam on the cracking of naphthalene as tar surrogate. Sardinia Conference 2019. Status: Accepted Oral Presentation

Peer-review papers submitted:

7. Gomez Rueda Y., Nuran Zaini I., Yang W., Helsen L.. Purification of syngas obtained from MSW using recycled calcined shells in a secondary tar cracking unit. Status: Submitted to biomass and bioenergy 2019.
8. Gomez Rueda Y., Helsen Lieve. Design and operation of a cold plasma reactor for pyrolysis oil reforming. Pyro2020. Ghent, Belgium
9. Gomez Rueda Y., Helsen Lieve. Valorization of cigarette butts by pyrolysis to be used as supercapacitor material. Ghent, Belgium

ESR7 – Katarzyna Janusz (KTH) - Solar-driven thermochemical conversion of RDF – Thermodynamic/kinetic analyses and heat/mass transfer modelling, WP2

Started on January 18, 2019.

1. Jagodzinska K., Nuran Zaini I., Svanberg R., Yang W., Jönsson P.G., Pyrolysis of excavated waste - A comprehensive study on the process products, *Journal of Cleaner Production* (submitted).
2. Jagodzinska K., Garcia-Lopez C., Pretz T., Yang W., Jönsson P.G., Py-GC/MS and XRF characterisation of excavated waste fractions: Insights into a possible re-evaluation of excavated waste, *Waste management* (to be submitted in 06.2020).



3. Jagodzinska K., Yang W., Jönsson P.G., Catalytic pyrolysis of excavated waste (estimated time of the submission is 12.2020).

ESR8 - Marco Gigantino (ETH Zürich) - Solar-driven thermochemical conversion of RDF – Solar reactor development, WP2

Peer-review journal articles:

1. Gigantino M., Kiwic D., Steinfeld A., Thermochemical energy storage via isothermal carbonation-calcination cycles of MgO-stabilized SrO in the range of 1000 - 1100 °C, *Solar Energy*, 188, 720-729 (2019) <https://doi.org/10.1016/j.solener.2019.06.046>
2. Parrodi J. C. H., Lucas H., Gigantino M., Sauve G., Esguerra J. L., Einhäupl P., ... & Krook J., Integration of resource recovery into current waste management through (enhanced) landfill mining. *Detritus*, 8, 141-156 (2019) <https://doi.org/10.31025/2611-4135/2019.13884>
3. Gigantino, M., Sas Brunser, S., Steinfeld, A. "Thermochemical energy storage via redox copper oxide couple: from particle design to packed-bed reactor engineering". In preparation.
4. Gigantino, M., Notter, D., Steinfeld, A. "Pure and mixed metal oxides granules for high-temperature thermochemical energy storage via reversible redox reactions". In preparation.
5. Gigantino, M., Notter, D., Bulfin, B., Steinfeld, A. "Redox kinetics and packed-bed reactor modelling of copper oxide-based granules for high-temperature thermochemical energy storage". In preparation.
6. Gigantino, M., Zaini. I.N., Gomez-Rueda Y., Helsen L., Yang W., Steinfeld, A. "Energy analysis of hydrogen and liquid hydrocarbon production via hybrid solar-/plasma-assisted gasification of carbonaceous solid waste". In preparation.

Conference contributions:

Parrodi, J. C. H., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J. L., Einhäupl, P. "Strategies for landfill mining - Integrating resource recovery into current waste management", 17th International Waste Management and Landfill Symposium. 2019. Cagliari. Italy. (paper)

Gigantino, M., Steinfeld, A. "Thermochemical energy storage materials for high-temperature concentrated solar energy", 12th European Congress of Chemical Engineering. 2019. Florence. Italy. (oral presentation)

Gigantino, M., Steinfeld, A. "High-temperature thermochemical heat storage: development of materials and lab-scale packed-bed prototype", SFERA III – 1st Doctoral Colloquium. 2019. Font-Romeu Odeillo, France. (oral presentation)

Gigantino, M., Steinfeld, A. "Development of reversible-reacting materials for high-temperature thermochemical heat storage of concentrated solar energy", 13th ASME Energy Sustainability Conference. 2019. Bellevue WA, USA. (oral presentation)

Gigantino, M., Jovanovic, Z., Steinfeld, A. "Thermochemical heat storage development for 24/7 solar-driven gasification of refuse-derived fuel, 4th International Symposium on Enhanced Landfill Mining. 2018. Mechelen, Belgium (poster)



Gigantino, M., Jovanovic, Z., Steinfeld, A., "Integration of concentrated solar energy into continuous gasification of refuse-derived fuel", 13th SOLLAB Doctoral Colloquium on Solar Concentrating Technologies. 2017. Berlin, Germany (oral presentation)

De Martín, L., Wu, K., Gigantino, M., Lettieri, P., Mazzei, L., & Coppens, M. O. "Experimental and computational study of pattern formation in periodically pulsed gas-solid fluidized beds". 14th AIChE Annual Meeting. 2014. Atlanta GA, USA (paper)

ESR9 - Hugo Lucas (RWTH Aachen)- Hollow electric arc conditioning of slags from thermochemical conversion technologies

Conference abstracts 2018:

1. P. Rabelo Monich, H. Lucas, B. Friedrich, and E. Bernardo, 'High strength cellular glass-ceramics from glass by-products of metal extraction processes applied on MSWI bottom ash', presented at the Material Science and Technology Conference 2018, Ohio, USA, 2018.
2. P. Rabelo Monich, R. E. Murillo Alarcón, H. Lucas, B. Friedrich, Y. Pontikes, and E. Bernardo, 'Upcycling of conditioned MSWI bottom ash into porous ceramics by means of strong or weak alkali activation', presented at the XVI ECerS conference, Turin, Italy, 2019.

Conference papers 2018

1. H. Lucas and B. Friedrich, 'Metallurgical concepts for recycling of bottom ashes from municipal waste incinerators', presented at the 4th International Symposium on Enhanced Landfill Mining, Mechelen, Belgium, 2018, vol. Upcycling technologies for Enhanced Landfill Mining, pp. 277–284.
2. H. Lucas, P. R. Monich, G. Sauve, B. Friedrich, E. Bernardo, and K. Van Acker, 'Sustainable Approach to Valorise Ashes from MSWI', presented at the Recy & DepoTech 2018, Leoben, Austria, 2018, vol. 14, pp. 637–644.
3. H. Lucas, G. Alkan, Buhle Xakalashé, and B. Friedrich, 'Conditioning of Bauxite Residue with Bottom Ash in view of recovery of valuable metals: A sustainable approach', presented at the 2nd Int. Bauxite Residue Valorisation and Best Practices, Athens, Greece, 2018.

Conference Abstracts 2019

1. Rabelo Monich, R. E. Murillo Alarcón, H. Lucas, B. Friedrich, Y. Pontikes, and E. Bernardo, 'Upcycling of conditioned MSWI bottom ash into porous ceramics by means of strong or weak alkali activation', presented at the XVI ECerS conference, Turin, Italy, 2019.

Conference papers 2019

1. P. Rabelo Monich, H. Lucas, B. Friedrich, M. Segata, A. Morbi, and E. Bernardo, 'Upcycling of vitrified residues by alkali activation and sinter-crystallization', presented at the 17th International waste management and landfill symposium, Sardinia, Italy, 2019, p. 2019.
2. H. Lucas and B. Friedrich, 'Thermodynamics of conditioning MSWI Bottom Ash using SAF for usage in minerals products', presented at the Slag valorisation symposium, Mechelen, Belgium, 2019, vol. Slag valorisation and thermodynamics, pp. 57–60.



3. P. Rabelo Monich, H. Lucas, B. Friedrich, and E. Bernardo, 'Porous glass-ceramics from alkali activation and sinter-crystallisation of vitrified bottom ash', presented at the Slag valorisation symposium, Mechelen, Belgium, 2019, vol. Slag valorisation as ceramics and insulation materials, pp. 221–224.
4. G. Sauve, H. Lucas, P. Rabelo Monich, E. Bernardo, B. Friedrich, and K. Van Acker, 'Life cycle assessment of novel technical routes to valorise MSWI bottom ash', presented at the Slag valorisation symposium, Mechelen, Belgium, 2019, vol. Slag valorisation as ceramics and insulation materials, pp. 221–224.
5. Lucas, H., Li, C., Hernandez Parrodi, J. C., Garcia Lopez, C., Gursel, D., Friedrich, B., Pretz, T., & Wotruba, H. (2019). Primary evaluation of the use and refining of Al scrap recovered from a landfill in Belgium Primary evaluation of the use and refining of Al scrap recovered from a landfill in Belgium. 1, 51–61. EMC, Dusseldorf, Germany. DOI: 10.13140/RG.2.2.11988.14725
6. Srecko Stopic , Christian Dertmann , Buhle Xakalashe , Gözde Alkan , Yagmurlu Bengi, Hugo Lucas , Bernd Friedrich. A near zero waste valorization vision for bauxite residue through experimental results. XXI YuCorr 2019, Tara Mountain, Serbia (2019).

Journals 2019

8. Lucas, H. I., Garcia Lopez, C., Hernández Parrodi, J. C., Vollprecht, D., Raulf, K., Pomberger, R., Pretz, T., & Friedrich, B. (2019). Quality assessment of nonferrous metals recovered from landfill mining: A case study in Belgium. *Detritus*, Volume 08-December 2019(0), 1. <https://doi.org/10.31025/2611-4135/2019.13879>
9. Rabelo Monich, P., Dogrul, F., Lucas, H., Friedrich, B., & Bernardo, E. (2019). Strong porous glass-ceramics from alkali activation and sinter-crystallization of vitrified mswi bottom ash. *Detritus*, Volume 08-December 2019(0), 1. <https://doi.org/10.31025/2611-4135/2019.13881>
10. Hernández Parrodi, J. C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J. L., Einhäupl, P., Vollprecht, D., Pomberger, R., Friedrich, B., Van Acker, K., Krook, J., Svensson, N., & Van Passel, S. (2019). Integration of resource recovery into current waste management through (enhanced) landfill mining. *Detritus*, Volume 08-December 2019(0), 1. <https://doi.org/10.31025/2611-4135/2019.13884>
11. D. Vollprecht, J.C. Hernández Parrodi, H. Lucas and R. Pomberger. Case study on enhanced landfill mining at Mont-Saint-Guibert landfill in Belgium: mechanical processing, physicochemical and mineralogical characterization of fine fractions <4.5 mm. *Detritus Journal*, (2020). <https://doi.org/10.31025/2611-4135/2020.13940>

Book contribution 2020

1. Lucas H. , Maier J. & Friedrich B. The Use of Submerged Arc Furnace (SAF) as a Robust Technology for Upcycling Waste into Standard Mineral Products for Construction Industry in: Mineral by-products and waste 7 - ashes, slags, dusts and construction waste. ISBN 978-3-944310-53-4 Thome-Kozmiensky Verlag. Pag. 272-287



Peer-review papers to be submitted:

1. P. Rabelo Monich, R. Murillo Alarcón, G. Sauve, H. Lucas, B. Friedrich, K. Van Acker, Y. Pontikes, E. Bernardo. Valorization of conditioned MSWI bottom ash into ceramic foams by means of alkali activation. *Journal of Construction and Building Materials*.
2. H. Lucas and B. Friedrich, 'Thermodynamic and modelling of thermal conditioning MSWI bottom ash for usage in minerals products', J. Draft.
3. P. Rabelo Monich, H. Lucas, B. Friedrich & E. Bernardo Development and recycling of porous vitrified MSWI bottom ash-based glass-ceramics by alkali activation and sinter-crystallization
4. H. Lucas and B. Friedrich, Chemical and physical properties of vitrified bottom ash.

ESR10 - Georgia Flesoura (KU Leuven) - Novel mechanical and electro-thermal techniques for the conditioning of slags from thermochemical conversion technologies, WP3

Flesoura et al. (2018), Dielectric properties measurements of municipal solid waste incinerator bottom ash at high temperatures, 4th International Symposium On Enhanced Landfill Mining, Mechelen, Belgium, 299-304.

Flesoura et al. (2019), In-situ measurements of high temperature dielectric properties of municipal solid waste incinerator bottom ash, *Ceramics International*, 45, 18571-18579.

Flesoura et al. (2019) Alkali activation of synthetic SiO₂-CaO-FeO_x-Al₂O₃-MgO glass, 6th International Slag Valorization Symposium, Mechelen, Belgium, 345–348.

Flesoura et al. (2020), Porous glass-ceramics made from microwave vitrified municipal solid waste incinerator bottom ash, Submitted in the journal of construction and building materials.

Flesoura et al. (2020), A new approach for the microwave thermal treatment of municipal solid waste incinerator bottom ash, Submitted in the journal of cleaner production.

ESR11 - Guilherme Ascensão (Italcementi) - Responsive inorganic polymers being reusable and recyclable for near-zero energy dwellings, WP3

Beersaerts, G., Ascensão, G. & Pontikes, Y., Modifying the pore size to minimize shrinkage by curing and using reactive and non-reactive additives in an Fe-rich inorganic polymer mortar (in preparation).

Ascensão, G., et al. (2019). Reaction kinetics and structural analysis of alkali activated Fe-Si-Ca rich materials, *Journal of cleaner production*. <https://doi.org/10.1016/j.jclepro.2019.119065>

Ascensão, G., et al. (2019). Increasing the dimensional stability of CaO-FeO_x-Al₂O₃-SiO₂ alkali-activated materials: on the swelling potential of calcium oxide-rich admixtures. *Detritus*. <https://doi.org/10.31025/2611-4135/2019.13880>



Ascensão, G., et al. (2019). Shrinkage characteristics and mitigation strategies to improve the dimensional stability of CaO-FeOx-Al₂O₃-SiO₂ inorganic polymers. *Materials*.
<https://doi.org/10.3390/ma12223679>

Ascensão, G., et al. (2019). High-temperature resistance of CaO-FeOx-Al₂O₃-SiO₂ alkali-activated materials. Conference abstract accepted and oral presentation in 17th International Waste Management and Landfill Symposium, Sardinia (Italy).

Ascensão, G., et al. (2019) The effect of polypropylene glycol on the Fe-rich alkali activated materials, in Proceedings of 17th International Waste Management and Landfill Symposium, Sardinia (Italy).

Ascensão, G., et al. (2019) The effect of polypropylene glycol on the Fe-rich alkali activated materials, Poster presentation in 17th International Waste Management and Landfill Symposium, Sardinia (Italy).

Ascensão, G., et al. (2019) The effect of CaO-rich admixtures on controlling drying shrinkage of alkali activated materials, in Proceedings of 6th International Slag Valorization Symposium, Mechelen (Belgium).

Ascensão, G., et al. (2019) The effect of CaO-rich admixtures on controlling drying shrinkage of alkali activated materials, Poster and oral presentation in 6th International Slag Valorization Symposium, Mechelen (Belgium).

Ascensão, G., et al. (2018) Influence of microstructure on mechanical strength of alkali activated Fe-Si-Ca rich materials, in Proceedings of the 4th Enhanced Landfill Mining Symposium (ELFM 2018), Mechelen (Belgium).

ESR12 - Patricia Rabelo Monich (University of Padova) - Waste-derived glass-ceramic products with novel functionalities, WP3

Peer-review papers published:

1. P. Rabelo Monich, A. Rincon Romero, D. Desideri, E. Bernardo, *Waste-derived Glass-Ceramics Fired in Nitrogen: Stabilization and Functionalization, Construction and Building Materials*, 232, 101-108 (2020). DOI: 10.1016/j.conbuildmat.2019.117265

2. P. Rabelo Monich, D. Vollprecht, E. Bernardo, *Dense glass-ceramics by fast sinter-crystallization of mixtures of waste-derived glasses, International Journal of Applied Ceramic Technology*, 17, 55-63 (2020). DOI: 10.1111/ijac.13332

3. P. Rabelo Monich, F. Dogrul, H. Lucas, B. Friedrich, E. Bernardo, *Strong porous glass-ceramics from alkali activation and sinter-crystallization of vitrified MSWI bottom ash, Detritus*, 08 (2019). DOI: 10.31025/2611-4135/2019.13881

4. P. Rabelo Monich, D. Desideri, E. Bernardo, *Low temperature upcycling of vitreous byproduct of the MSW plasma processing into multifunctional porous glass-ceramics, Advances in Applied Ceramics*, 118, 366-371 (2019). DOI: 10.1080/17436753.2019.1595265



5. P. Rabelo Monich, A. Rincon Romero, D. Höllen, E. Bernardo, Porous glass-ceramics from alkali activation and sinter-crystallization of mixtures of waste glass and residues from plasma processing of municipal solid waste, *Journal of Cleaner Production*, 188, 871-878 (2018). DOI: 10.1016/j.jclepro.2018.03.167

Peer-review papers submitted:

1. P. Rabelo Monich, A. Rincon Romero, E. Rambaldi, E. Bernardo, Case studies of up-cycling of partially crystallised ceramic waste in highly porous glass-ceramics. The paper was submitted to *Construction and Building Materials*.
2. G. Flesoura, P. Rabelo Monich, R. Murillo Alarcón, D. Desideri, E. Bernardo, J. Vleugels, Y. Pontikes, Porous glass-ceramics made from microwave vitrified municipal solid waste incinerator bottom ash. The paper was submitted to *Construction and Building Materials*.

Peer-review papers to be submitted:

1. P. Rabelo Monich, H. Lucas, B. Friedrich, E. Bernardo, Recyclable porous vitrified MSWI bottom ash-based glass-ceramics by alkali activation and sinter-crystallization. The paper will be submitted to *Journal of Cleaner Production*.
2. P. Rabelo Monich, R. Murillo Alarcón, G. Sauve, H. Lucas, B. Friedrich, K. Van Acker, Y. Pontikes, E. Bernardo, Valorisation of conditioned MSWI bottom ash into ceramic foams by means of alkali activation. The paper will be submitted to *Construction and Building Materials*.

ESR13 - Giovanna Sauve (KU Leuven) - Integrated LCA and RA methodology for environmental assessment of EFM, WP4

Peer-reviewed papers submitted:

1. Hernández Parrodi J.C., Lucas H., Gigantino M., Sauve G., Esguerra J.L., Einhäupl P., Vollprecht D., Pomberger R., Friedrich B., Van Acker K., Krook J., Svensson N., Van Passel S., 2019, Integration of resource recovery into current waste management through (enhanced) landfill mining, *Detritus (Published)*
2. Sauve G., Van Acker K., The environmental impacts of landfills in Europe: defining proper reference cases to support decision making, *Journal of Environmental Management, (Published)*

Peer-reviewed papers to be submitted:

1. Sauve G., Esguerra J.L., Krook J., Svensson N., Van Passel S., Van Acker K., Integrated ex ante environmental and techno economic assessment of emerging technologies: the case of plasma gasification for EFM (*In pipeline*)
2. Sauve G., Van Acker K., A novel integrated life cycle assessment (LCA) and risk assessment (RA) approach for the estimation of landfill impacts under varying environmental and engineering conditions (*In pipeline*)
3. Esguerra J.L., Sauve G., Van Acker K., Van Passel S., Svensson N., Krook J., Integrated environmental and economic assessment of resource recovery through enhanced landfill mining (*In pipeline*)



4. Rabelo Monch P., Murillo Alarcón R., Sauve G., Lucas H., Friedrich B., Van Acker K., Pontikes Y., Bernardo E., Valorisation of conditioned MSWI bottom ash into ceramic foams by means of alkali activation (*In pipeline*)
5. Flesoura G., Sauve G., Murillo Alarcón R., Van Acker K., Vleugels J., Pontikes Y., Production of porous inorganic polymers from microwave vitrified municipal solid waste incinerator bottom ash (*upcoming*)

Conference papers published:

1. Sauve G., Van Acker K., How the evolution of MSW composition affects the environmental impact of landfills: A review on European case studies, Proceedings of the 16th International Waste Management and Landfill Symposium, Sardinia (Italy), 2-6 October 2017 (*Oral presentation*)
2. Sauve G., Van Acker K., To mine or not to mine: a review of the effects of waste composition, time and long term impacts of landfills in the decision making for ELM. Proceedings of the 4th International Symposium on Enhanced Landfill Mining (ELFM IV), Mechelen (Belgium), 5-6 February 2018 (*Oral presentation*)
3. Sauve G., Lucas H., Rabelo Monich P., Bernardo E., Friedrich B., Van Acker K., Life cycle assessment of novel technical routes to valorize MSWI Bottom Ash. Proceedings of the 6th International Slag Valorisation Symposium, Mechelen (Belgium), 1-5 April 2019 (*Oral presentation*)
4. Sauve G., Esguerra J.L., Krook J., Svensson N., Van Passel S., Van Acker K., Integrated ex-ante environmental and techno-economic assessment of plasma gasification for enhanced landfill mining, *Setac Conference*, Helsinki (Finland), 26-30 May 2019 (*Oral presentation*)
5. Sauve G., Van Acker K., Integrating life cycle assessment and risk assessment to define a consistent reference scenario in the environmental feasibility assessment of (enhanced) landfill mining, Proceedings of the 17th International Waste Management and Landfill Symposium, Cagliari (Italy), 30 September-4 October 2019 (*Oral presentation*)

ESR14 - John Laurence Esguerra (Linköping University) - Techno-Economic and Multi-Criteria Assessments of ELM concepts and technologies, WP4

Published

Esguerra, J.L., 2020. Economics of Landfill mining: Usefulness and validity of different assessment approaches. Licentiate Thesis. Linköping University. ISBN 978-91-7929-852-4
<https://doi.org/10.3384/lic.diva-165391>

Esguerra, J.L., Krook, J., Svensson, N., Van Passel, S., 2019. Assessing the economic potential of landfill mining: Review and recommendations. *Detritus* 8, 125–140. <https://doi.org/10.31025/2611-4135/2019.13883>

Laner, D., Esguerra, J.L., Krook, J., Horttanainen, M., Kriipsalu, M., Rosendal, R.M., Stanislavljević, N., 2019. Systematic assessment of critical factors for the economic performance of landfill mining in Europe: What drives the economy of landfill mining? *Waste Manag* 95, 674–686.
<https://doi.org/10.1016/j.wasman.2019.07.007>

Hernández Parrodi, J.C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J.L., Einhüpl, P., Vollprecht, D., Pomberger, R., Friedrich, B., Van Acker, K., Krook, J., Svensson, N., Van Passel, S., 2019. Integration of resource recovery into current waste management through (enhanced) landfill mining. *Detritus* 8, 141-156. <https://doi.org/10.31025/2611-4135/2019.13884>



Esguerra, J.L., Krook, J., Svensson, N., Van Passel, S., 2018. Is enhanced landfill mining profitable? International Solid Waste Association (ISWA) 2018 World Congress, 22-25 October, Kuala Lumpur, Malaysia, pp. 240-245.

Esguerra, J.L., Svensson, N., Krook, J., Van Passel, S., Van Acker, K., 2018. The economic and environmental performance of a landfill mining project from the viewpoint of an industrial landfill owner. 4th International Symposium on Enhanced landfill Mining, 5-6 February, Mechelen, Belgium, pp. 389-396.

Upcoming publications

Esguerra, J.L., Laner, D., Krook, Svensson, N., 2020. Exploring strategies for an improved economic performance of landfill mining in Europe.

Esguerra, J.L., Sauve, G., Krook, J., Svensson, N., Van Passel, S., Van Acker, K., 2020. Economic and environmental trade-off analysis of enhanced landfill mining: The case of ETN NEW-MINE.

Esguerra, J.L., Svensson, N., Krook, J., 2021. Quantification of uncertainties in upscaling of a landfill mining project.

ESR15 - Paul Einhäupl (KU Leuven) - Policy and market interventions for facilitating ELFM implementation, WP4

Journal papers:

Einhäupl, P., Van Acker, K., Svensson, N., & Van Passel, S. (2019). Developing stakeholder archetypes for enhanced landfill mining. *Detritus*, Volume 08, 1. Retrieved from <https://digital.detritusjournal.com/doi/13882-269>

Hernández Parrodi, J. C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J. L., Einhäupl, P., Vollprecht, D., et al. (2019). Integration of resource recovery into current waste management through (enhanced) landfill mining. *Detritus*, Volume 08, 1. Retrieved from <https://digital.detritusjournal.com/doi/13884-271>

Einhäupl, P., Krook, J., Svensson, N., Van Acker, K., & Van Passel, S. (2019). Eliciting stakeholder needs – An anticipatory approach assessing enhanced landfill mining. *Waste Management*, 98, 113–125. Retrieved from <https://linkinghub.elsevier.com/retrieve/pii/S0956053X19305203>

Conference papers:

Einhäupl, P., Van Acker, K., & Van Passel, S. (2019). Integrating Societal Impacts Into Enhanced Landfill Mining Assessment. 17th International Waste Management and Landfill Symposium. Santa Margherita di Pula, Italy: CISA Publisher.

Hernández Parrodi, J. C., Lucas, H., Gigantino, M., Sauve, G., Esguerra, J. L., & Einhäupl, P. (2019). Strategies for Landfill Mining-Integrating Resource Recovery Into Waste Management. 17th International Waste Management and Landfill Symposium. Santa Margherita di Pula, Italy: CISA Publisher.



Einhäupl, P., Krook, J., Svensson, N., Van Acker, K., & Van Passel, S. (2018). Enhanced Landfill Mining at the Remo Site: Assessing Stakeholders' perspectives for Implementation. In P. T. Jones & L. Machiels (Eds.), Proceedings of the 4th International Symposium on Enhanced Landfill Mining (pp. 367–377). Mechelen.

Upcoming

Einhäupl, P., Van Acker, K., Peremans, H., & Van Passel, S. (2020). The Conceptualization of Societal Impacts of Landfill Mining – A System Dynamics Approach. TBD.

