

Senior Researcher-Dr. Julio C. Castillo

Senior Researcher
Department of Microbial, Biochemical
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Education

- 2017 Senior Researcher of the Department of Microbial, Biochemical and Food Biotechnology of the University of the Free State- South Africa.
- 2017 Water Institute of Southern Africa: member n° 30591.
- 2017 Post-graduate Advanced Course (Workshop): Software Carpentry (Bioinformatics) workshop. University of the Free State, South Africa.
- 2016 Post-graduate Advanced Course (Workshop): SPSS basic and advanced course. University of the Free State, South Africa.
- 2015 Post-graduate Advanced Course (Workshop): The Geochemist's Workbench 10: Fate and Transport Modeling. Johannesburg, South Africa.
- 2014 Post-graduate Advanced Course: INTRODUCTORY COURSE Synchrotron EXAFS & XANES for Chemical Speciation on Environmental Systems. ALBA Synchrotron facilities. Barcelona, Spain.
- 2014 Postdoctoral Research of the Department of Microbial, Biochemical and Food Biotechnology of the University of the Free State- South Africa.
- 2013 Ph.D: Geology and Environmental Management of Mineral Resources with European Doctor Mention, International University of Andalucía and University of Huelva.
- 2012 Post-graduate Advanced Course: Modelling of surface reactions of ferric hydroxides. University of Bayreuth - Germany.
- 2012 Post-graduate Advanced Course: Environmental Iron Microbiology, University of Manchester/Bangor, UK.
- 2010 Post-graduate Advanced Course: Specialized analytical techniques for trace elements. Methodology, applications and regulations. University of Huelva.

- 2010 M.S. Instrumental Techniques in Chemistry, University of Huelva.
- 2008 Certificate of advanced studies: Geology and Environmental Management of Mineral Resources, International University of Andalucía and University of Huelva.
- 2007 M.S. and Ph.D: Geology and Environmental Management of Mineral Resources, International University of Andalucía and University of Huelva.
- 2006 Post-graduate Advanced Course: Project formulation and evaluation of public investment, University of Señor de Sipan – Perú.
- 2006 Post-graduate Advanced Course: HACCP plan design, National University Pedro Ruiz Gallo.
- 2004 Degree in Biology, Specialist in Microbiology, National University Pedro Ruiz Gallo.

Area of interest

Bio-remediation, Bio-recovery, Nanoparticles, Microbial-metal interactions, Community structure and function of biofilms and Bioaccumulation of metals.

Research Activity and Positions

- 2015-2020 **Research member: Biogeochemical project. South African Research Infrastructure Roadmap.**
- 2017- **Research member (Head drafting, development and execution the**
Currently **project):** Water bio/remediation: project Union Mine. University of the Free State.
- 2015-2017 **Research member (Head drafting, development and execution the**
project): ERA-MIN Joint Call 2014 Sustainable supply of raw materials in Europe. Interaction Bacteria: Rare Earth. Accepted on January 2015.
- 2013- **Research member (Head drafting, development the proposal and**
Currently **execution the project):** Water bio/remediation: project EXXARO and ESKOM. University of the Free State.
- 2011-2012 **Research Contract** of the University of Huelva and University of Algarve, Project: INTERREG (TRASAGUA-BIOREMEDIATION OF AMD), Subproject of I2TEP.
- 2009-2010 **Research Contract** of the University of Huelva and CSIC, Project

“Natural attenuation and passive treatment of acid mine drainage in the basin of the Odiel river”. (Ref. CTM2007-66724-C02-02/TECNO).

2008-2009 **Research Contract** of the University of Huelva and University of Granada, Project “Environmental impact and social change in the south of the Iberian Peninsula during recent prehistory” (Ref. P06-HUM-01658).

2007 **Research Contract** of the Mina Cobre Las Cruces, S.A.

Research Network

2017-Current Senior Research.

- University of Huelva, Institute of Environmental Assessment and Water Research-Barcelona, Institut de Chimie Séparative de Marcoule-France, University of Applied Sciences Magdeburg-Stendal Water, Environment, Civil Engineering and Safety, State Key Laboratory of Biogeology and Environmental Geology, China University of Geosciences, Department of Life Science National Institute of Technology Rourkela, India, University of Calgary, Geosyntec Consultants Inc-USA, ESKOM, SOTH32, EXXARO, Schlumberger water services-Chile and University of Chile

2013-2017 Postdoctoral Research.

- Acid/alkaline mine drainage: Professor Jose Miguel Nieto. Dept. of Geology, University of Huelva.
- Sulphate reducing bacteria- bioremediation of phosphogypsum stacks: Dr Rafael Pérez López. Dept. of Geology, University of Huelva.
- Nitrogen cycle: Professor Jose Berenguer Carlos. Autonomous University of Madrid.
- Biorecovery of metals from mining wastes (Lithium and rare earth): Assistant professor Manuel Caraballo. Dept of Mining Engineering, University of Chile.
- Copper native bioaccumulation: Prof. Alfonso Corza. Biology department, University of Cadiz.

- Rare Earth: Prof. Carlos Ayora. IDÆA-CSIC, Barcelona-Spain.
- Rare earth recovery from phosphogypsum: Prof. Petra Schneider. International Water Management Hochschule Magdeburg, Germany.
- Extremophiles: PhD student OO Kuloyo. University of Calgary, Canada.

2008-2012 Doctoral Thesis. Autonomous University of Madrid

Thesis: *“Biogeochemical processes of sulfate-reducing involved in the remediation of acid mine drainage and phospho-gypsum stacks”*

Advisors: Rafael Pérez López (Univ. of Huelva) and José Miguel Nieto, University of Huelva

In addition to my thesis study other topics are covered in collaboration with other national and international researchers:

- Study of Neutralization of acid mine drainage using the final product from CO₂ emissions capture with alkaline paper mill waste. Collaborative work with Dr. Rafael Pérez López. University of Huelva, Spain.
- Role of iron oxidizing bacteria and acidophilic algae in the acid mine drainage at Rio Tinto. Collaborative work with Professor Dr. Rosa León. University of Huelva, Spain.
- Sulfate reducing bacteria technology implementation in the passive treatment of acid mine drainage. Collaborative work with Dr. Monica Martins. University of Lisbon, Portugal.
- Toxicology of heavy metals in acid mine drainage. Collaborative work with Dr. Aguasanta Sarmiento. University of Cadiz, Spain.

2012 Research stay (3 months) at the Research Group of “Hidrology”, University of Bayreuth, Germany.

- Speciation of polysulfides generated by lepidocrocite reduction in the presence of sulphate-reducing bacteria.

International Publications (16)

Karabelo Moloanto, Abdon Atangana, Esta van Heerden, **J Castillo** (2018). Study of environmental factors direct and indirect involved in the sulphate-reduction biogeochemical processes and its integration in a kinetic model. To be

- submitted to *Frontiers in Microbiology*.
- Ester Torres, Alba Lozano, Francisco Macías, Alba Gomez-Arias, **Julio Castillo**, Carlos Ayora (2018). Passive elimination of sulfate and metals from acid mine drainage using combined limestone and barium carbonate systems. *J Clean Prod.* 182:114-123
- Peter J. Williams, Elizabeth Ojo, Errol Cason, **Julio Castillo**, Mary F. DeFlaun, and Esta van Heerden (2017). Hexavalent Chromium Bioreduction and Chemical Precipitation of Sulphate as a Treatment of Site-specific Fly Ash Leachates. *World J Microbiol Biotechnol.* 33:88.
- Alba Gomez, **Julio Castillo**, Esta van Heerden, Danie Vermeulen (2016). Use of alkaline mine waste as treatment for acid drainage. IMWA-Germany (International Mine Water Association). 11th IMWA Annual Conference. Paper n° 223.
- Alba lozano, Carlos ayora, Francisco macias, Jose miguel nieto, Alba gomez-arias, **Julio castillo**, Esta van hereden (2015). Sulphate removal from acid mine drainage: evaluation of granular BaCO₃ with column experiments. *Macla* n° 20.
- Julio Castillo**, JJ Posthumus, Alba Gomez, Esta Van Heerden (2015). Geochemical study of the interaction of acid and alkaline mine drainage with BaCO₃. *Proceedings of the 10th ICARD & IMWA Annual Conference*, paper n° 290.
- Alba Gomez, **Julio Castillo**, JJ Posthumus, Esta van Heerden (2015). Evidences of effective treatment of alkaline mine drainage with BaCO₃. *Proceedings of the 10th ICARD & IMWA Annual Conference*, paper n° 303.
- Maleke M. Maleke, **Julio Castillo**, Peter J. Williams, Elsabe Botes, Abidemi Ojo, Mary F. DeFlaun, Esta van Heerden (2015). Optimization of a bioremediation system of u (VI) based on the biostimulation of an indigenous bacterial community. *Environ Sci Pollut Res Int.* 22:8442-50.
- J Castillo**, R Pérez-López, AM Sarmiento, JM Nieto (2012). Evaluation of organic substrates to enhance the sulfate-reducing activity in phosphogypsum. *Sci Total Environ.* 439:106-113.
- J Castillo**, R Pérez-López, MA Caraballo, JM Nieto, M Martins, M Clara Costa, M Olías, JC Cerón, R Tucoulou (2012). Biologically-induced precipitation of sphalerite–wurtzite nanoparticles by sulfate-reducing bacteria: Implications for acid mine drainage treatment. *Sci Total Environ.* 423:176-184.
- R Pérez-López, **J Castillo**, AM Sarmiento, JM Nieto (2011). Assessment of

- phosphogypsum impact on the salt-marshes of the Tinto river (SW Spain): Role of natural attenuation processes. *Mar Pollut Bull.* 62:2787-2796.
- MA Caraballo, F Macías, JM Nieto, C Ayora, **J Castillo**, D Quispe (2011). Hydrochemical performance and mineralogical evolution of a dispersed alkaline substrate (DAS) remediating the highly polluted acid mine drainage in the full scale passive treatment of Mina Esperanza (SW, Spain). *Am Mineral.* 96:1270-1277.
- R Pérez-López, Dino Quispe, **J Castillo**, JM Nieto (2011). Neutralization and retention of metals in acid mine drainage from the Iberian Pyrite Belt with Paper Waste Industry Huelva. *Am Mineral.* 96:781-791.
- J. Castillo**, R. Pérez-López, M.A. Caraballo, J.M. Nieto (2011). Precipitation of sphalerite and wurtzite by sulfate-reducing bacteria. *Macla* nº 15.
- R Pérez-López, **J Castillo**, D Quispe, JM Nieto (2010). Neutralization of acid mine drainage using the final product from CO₂ emissions capture with alkaline paper mill waste. *J Hazard Mater.* 177: 1-3.
- J. Castillo** (2009). Experimental study of the environmental applications of an alkaline residue in the paper industry. *Journal of the Spanish Society of Mineralogy Macla* nº 12.

Books (2)

- J. Castillo**, A. Gómez-Arias, R. Pérez-López, J.M. Nieto (2013). Atenuación natural de la contaminación de las balsas de fosfoyeso por bacterias sulfato reductoras. 2013. ISBN: 978-83-7993-243-5. University International Andalucía; 1-71.
- J.C. Cerón, R. Pérez-López, **J. Castillo**, M. Olías, J.M. Nieto (2012). Algunos aspectos hidroquímicos y biológicos del tratamiento pasivo de drenaje ácido de mina, Cueva de la Mora-Huelva. IGME (ISBN: 978-84-7840-863-4) - Madrid.

International Proceedings and Abstracts (27)

- Corinne Fourie, **J Castillo**, J Vermeulen, ED Cason, A Valverde. New insights on selective precipitation and hyperaccumulation of native copper by biological pathways. South African Society for Microbiology (SASM) conference, 2018.
- MM Maleke, ED Cason, J Vermeulen, KM Moloantoa, A Gomez-Arias, E van Heerden, A Valverde, **J. Castillo**. New insights into microbial rare earth

- interactions: Bioreduction and Bioaccumulation. South African Society for Microbiology (SASM) conference, 2018.
- KM Moloantoa, **J Castillo**, MM Maleke, E Cason, J Vermuelen, E van Heerden, A Valverde. Isolation and characterization of denitrifying bacteria from open cast mines of Southern Africa. South African Society for Microbiology (SASM) conference, 2018.
- Abidemi Ojo, D. Litthauer, A. Valverde, J. Albertyn, , E. Cason, **J. Castillo**. Characterization of the sequential biodegradation of chloroethenes. South African Society for Microbiology (SASM) conference, 2018.
- Alba Gomez, **Julio Castillo**, Megan Welman-Purchase, Maleke Maleke, Esta van Heerden. Novel strategy to concentrate rare earth elements by neutralization of acid drainage from phosphogypsum stacks using carbonatites. 2nd European Rare Earth Resources Conference (ERES), Santorini, 28-31, June, 2017.
- Maleke M. Maleke, **J Castillo**, E. Cason, Alba Gomez, K. M. Moloantoa, Esta van Heerden. New reductive interactions of REY by *Thermus scotoductus* sa-01 and *Clostridium* sp.. 2nd European Rare Earth Resources Conference (ERES), Santorini, 28-31, June, 2017.
- M^a Carmen Duran-Ruiz, Sandra Torres Herrera, **Julio Castillo**, Borja Linage, Mercele Vermeulen, Juan Luis Jimenez-Arias, Jose Miguel Nieto, Esta van Heerden, Alfonso Corzo, Sokratis Papaspyrou. Integrated metaproteomic and metagenomic analysis of a microbial biofilm adapted to extreme acidic conditions from an acid mine drainage system. Poster, 6th Seprot (Spanish Society of Proteomic) Congress, 2016.
- J. Castillo**, B. Linage, C. Fourie, M. Vermeulen, E. Cason, E. coetsee-hugo, H.Swart, J.M. Nieto, F. Macias, M. Caraballo, M. Becerra-herrera, A. Gomez-Arias, A. Corzo, S. Papaspyrou, J.L. Jimenez-Arias, J.A. Gonzalez-Perez and E. Van Heerden. Bacterial mutualism as new strategy of survive extreme acidic and microaerophilic conditions. Conference, Goldschmidt Yokohama, 2016.
- Alba Gomez, **Julio Castillo**, Esta van Heerden, Danie Vermeulen. Use of alkaline mine waste as treatment for acid drainage. IMWA-Germany 2016 (International Mine Water Association). Proceedings, 2016.
- Maleke M. Maleke, **J Castillo**, E. Cason, Esta van Heerden. Rare earth elements in phosphogypsum waste stacks: a model for microbial interaction with thermus scotoductus sa-01. The 3rd International Congress on Water, Waste and Energy

- Management (EWWM), 2016.
- K. M. Moloantoa, **J. Castillo**, and E. van Heerden. A bioremedial candidate solution for nitrate contamination in open cast mines of Southern Africa. The 3rd International Congress on Water, Waste and Energy Management (EWWM), 2016.
- J Chen, E. van Heerden, **J. Castillo**, E. Cason, L. Esterhuizen. Scoping study on current emerging contaminants, geochemistry and microbial diversity influencing quality of water sources in the Free State Province. DRAFT Conference Booklet_AWS, 2015.
- K. M. Moloantoa, **J. Castillo**, and E. van Heerden. biogeochemical of sulfate reducing communities enriched from mine drainages. Conference: South african young water professionals, 2015.
- Julio Castillo**, JJ Posthumus, Alba Gomez, Esta Van Heerden. Geochemical study of the interaction of acid and alkaline mine drainage with BaCO_3 . IMWA-Chile (International Mine Water Association). Proceedings, 2015.
- Alba Gomez, **Julio Castillo**, JJ Posthumus, Esta van Heerden. Evidences of effective treatment of alkaline mine drainage with BaCO_3 . IMWA-Chile (International Mine Water Association). Proceedings, 2015.
- Moloantoa K. M., **Castillo J.** and van Heerden E. Biogeochemical of sulfate reducing communities enriched from mine drainages. Conference: South-African young water professionals, 2015.
- Julio Castillo**, JJ Posthumus, Alba Gomez, Esta Van Heerden. Geochemical interaction of acid and alkaline mine drainage (AMD) with BaCO_3 : Optimization of biological and chemical systems for AMD treatment. 21st General Meeting of the International Mineralogical Association (IMA), South Africa, 2014.
- Alba Gomez, **Julio Castillo**, JJ Posthumus, Esta van Heerden. Evidence for effective treatment of alkaline mine drainage using a matrix of BaCO_3 and wood chips: solution for in-situ passive treatment. 21st General Meeting of the International Mineralogical Association (IMA), South Africa. 2014.
- VickeyDiedericks, **Julio Castillo**, Esta Van Heerden. The reduction of Cr(VI) using pilot-scale bioreactors. 21st General Meeting of the International Mineralogical Association (IMA), South Africa. 2014.
- KarabeloMoloanto, **J Castillo**, Moli Wan, Stefan Peiffer, Esta van Heerden. Speciation of polysulfides generated by lepidocrocite reduction in the presence of sulphate-

- reducing bacteria. 21st General Meeting of the International Mineralogical Association (IMA), South Africa. 2014.
- Maleke M. Maleke, **J Castillo**, Peter J. Williams, Elsabe Botes, Abidemi Ojo, Mary F. DeFlaun, Esta van Heerden. Optimization of a bioremediation system of u (vi) based on the biostimulation of an indigenous bacterial community. 21st General Meeting of the International Mineralogical Association (IMA), South Africa, 2014.
- J Castillo**, A Ojo, J Posthumus, R Gobber, O Kuloyo, B Linage, E Van Heerden. Assessment of microbial diversity in diesel-contaminated soil (South Africa): Role of natural attenuation processes. 2014. 24th biennial congress of the South African Society of Biochemistry and Molecular Biology, South Africa.
- OO Kuloyo, B Linage-Alvarez, A. Ojo, **J. Castillo**, E. Van Heerden. The search for *Candidatus Desulfosporosinus audaxviator* yields additional sulphate reducing bacteria from a South African gold mine (2.8kmbls). 24th biennial congress of the South African Society of Biochemistry and Molecular Biology, South Africa, 2014.
- J. Castillo**, R. Pérez-López; M.A. Caraballo, J.M. Nieto. Precipitation of sphalerite and wurtzite by sulfate-reducing bacteria. XXXI Reunión Científica de la SEM, Barcelona, 2011.
- J. Castillo**, R. Pérez-López, M.A. Caraballo, J.M. Nieto. Zinc removal by sulfate-reducing bacteria: implications for acid mine drainage treatment (Poster presentation). Goldschmidt Congress, Knoxville, USA, 2010.
- J. Castillo**, D. Quispe, R. Pérez-López, J. M. Nieto. Experimental study of the environmental applications of an alkaline residue in the paper industry. Poster: week of Science and Technology, University of Huelva, 2008.
- D. Quispe, **J. Castillo**, R. Pérez, J. M. Nieto. Neutralization and metal retention in acid mine drainage of the Pyrite Belt, with waste paper industry of Huelva. Poster: week of Science and Technology, University of Huelva, 2008.

Awards (1)

- 2012** International Award in the area of science and technology by the study: “Atenuación natural de la contaminación por bacterias sulfato reductoras”. University International of Andalucía.

Patent (2)

- 2014 Julio Cesar Castillo Hernandez**, Alba Gomez Arias and Esta van Heerden.
Title: BDAS (Barium Carbonate - Dispersed Alkaline Substrate). South African Patent. Number P49198ZAPO.
- 2015 Julio Cesar Castillo Hernandez**, Alba Gomez Arias and Esta van Heerden.
Title: Mine drainage remediation using barium carbonate dispersed alkaline substrate. International Patent. Number PCT/IB2015/056760.

Organization Conference Session (2)

- Manuel A. Caraballo; Esta van Heerden; Harish Veeramani; Julio Castillo (Convenors).
Applied Geochemistry and Geomicrobiology for the remediation of inorganic pollutants: from the nano to the meter scale. 21st General Meeting of the International Mineralogical Association (IMA), South Africa, 2014.
- Reviewer in IMWA-Chile 2015 (International Mine Water Association) conference.
Paper:
Effluent chemistry of closed sulfide mine tailings – influence of ore type (2015).
Kauppila Päivi M. & Räisänen M. Liisa.
The effect of aluminium source and sludge recycling on the properties of ettringite formed during water treatment (2015). Devin Sapsford, Sandra Tufvesson, Richard Coulton, Tom Penny, Keith Williams.

Reviewer (6)

- NRF, South Africa. 2017.
- Water Research. 2016.
- Environmental Engineering Science. 2015.
- Ecological Engineering. 2015.
- Mine Water and the Environment. 2015.
- Journal of Hazardous Materials. 2014.
- Int. J. Environmental Engineering. 2013.

Honors and Master Supervisor (13)

Honours students:

Co supervisor: Mr Jan Johannes Posthumus, South Africa. Title: The role of sulfate-reducing bacteria in the treatment of acid mine drainage. Honours in Biochemistry at the University of the Free State (finalized 2013).

Supervisor: Ms. Happiness Puleng January, South Africa. Title: Diversity of bacterial communities during AMD treatment by the BDAS system. Honours in Biochemistry at the University of the Free State (finalized 2017).

Master students:

Co supervisor: Mr Karabelo Moloantoa, South Africa. Title: Biogeochemical and kinetics characterization of SRB from Acid mine drainages. Master in Biochemistry at the University of the Free State. (finalized 2015).

Co supervisor Honours and Master (2015-2018): Ms. Corinne Fourie, South Africa. Honours (finalized 2015) and Master (In progress). Title: Microbial-metal interactions and the copper conundrum. Master in Biochemistry at the University of the Free State.

Co supervisor Honours and Master (2015-2018): Mr. Teboho Cletus Rankoroane, Lesotho. Honors title: The role of copper in bacterial metabolism with emphasis on microbial interactions (finalized 2016). Master title: Development of novel Natural Desalinization Process (NDP) system. degree in Microbial Biotechnology at the University of the Free State. Master in Biochemistry at the University of the Free State.

Co supervisor Master (2017-2018): Mr. Gerhard Potgieter, South Africa. Title: Understanding the Biogeochemical cycle of arsenic: bioremediation practices and industrial applications. Master in Biochemistry at the University of the Free State.

PhD students:

Co supervisor (2015- 2018): MSc Karabelo Moloantoa, South Africa. Title: biological

reduction of nitrate (in progress). Ph D. Biotechnology department at the University of the Free State.

Co supervisor (2015- 2018): MSc Maleke Maleke, South Africa. Title: Study and identification of biogeochemical strategies to uptake and bio-recovery rare earth in extreme environment (in progress). Ph D. Biotechnology department at the University of the Free State.

Co Supervisor (2015-2018): MSc Alba Gomez Arias, Spain. Title: Contamination of aquifers by leachates from phosphogypsum stacks: contamination assessment, treatment research, prevention of future contamination and options of revalorization (in progress). Ph D. Hydrogeology, Institute of Groundwater at the University of the Free State.

Co Supervisor (2015-2018): MSc. Jou-An Chen, South Africa. Title: Study and assessment of fate and uptake of pharmaceuticals in water and sediment systems of dam in South Africa (in progress). Ph D. Biotechnology department at the University of the Free State.

Co Supervisor (2015-2018): MSc. Abidemi Ojo, Nigeria. Title: Assessments of site specific microbial reductive dechlorination of chloroethene compounds (in progress). Ph D. Biotechnology department at the University of the Free State.

Equipment (user)

Equipment: HPLC.

Equipment: ICP – OES.

Equipment: XRD.

Equipment: XPS.

Equipment: Synchrotron Radiation (μ XRF- μ XRD).

Equipment: SEM-EDS – Microsonda.

Equipment: PCR-Cloning.

Equipment: Next generation sequencing.

Informatic

Microsoft Word, Microsoft Excel, PREZI, Origin Pro, SPSS, Adobe Illustrator, Adobe Photoshop, CorelDraw, Phreeqc, Minteq, waterq4f, The Geochemist's Workbench software, Mega and RDP.

Work Experience

- 2003** Internship Minsa-Hospital Regional, Clinical Laboratory, Chiclayo-Perú.
- 2004** Internship in companies exporting food, quality control scholarship “Gandules S.A.”
- 2005- 2006** Supervisor of Production and Quality Control, implementation of HACCP “Altomayo” y PERHU S.A.”

Thecnical Reports (26)

ESKOM consolidation report, 2018

BRICS call-Pesticides and fertilizers pollution. 2018

NDP (Natural desalinization process) WRC 2017

ERAMIN 2 project. 2017

ERAWATER project. (Proposal done for the next year). 2017

EUROPHOS project. (Proposal done for the next year). 2017

Biogeochemistry project.

Biogeochemistry research infrastructure platform summary. September 2016. 100 pages.

Union Mine project

Thecnical report (2): Union Mine (pilot scale design). Julio Castillo, E van Heerden. April 2016- August 2017. 30 pages.

Eskom project

Thecnical report (11): Eskom (pilot scale). Julio Castillo, JJ Posthumus, E van Heerden. November 2013- August 2016. 150 pages.

Exxaro project

Thecnical report (8): Exxaro (pilot scale). Julio Castillo, JJ Posthumus, E van Heerden. January 2013- August 2015. 200 pages.

Mogale project

Technical Report: Mogale (lab scale). O Kuloyo, Julio Castillo, JJ Posthumus, E van Heerden. December 2014. 10 pages.

ERAMIN project.

First report: Extraction of Rare Earths Elements from Acid Mine Drainage. Julio Castillo, Alba Gomez, E van Heerden. July (2016).

Synchrotron proposals (2)

μXRF-LNLS (Brazilian Synchrotron Light Laboratory)

Proposal ID: 20160199. Bacterial mutualism as novel strategies for ROSs (Radical Oxygen Species) and copper homeostasis under extreme acidic and microaerophilic conditions. 2016. Accepted.

XANES- LNLS (Brazilian Synchrotron Light Laboratory)

Proposal ID: 20160525. Bacterial mutualism as novel strategies for ROSs (Radical Oxygen Species) and copper homeostasis under extreme acidic and microaerophilic conditions. 2016. Accepted.