

APCOM 2015

37th International Symposium on the Application of Computers and Operations Research in the Mineral Industry

May 23th-27th 2015 at Westmark Hotel and Convention Center
Fairbanks AK

Main Sponsors



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Date/Time		
May 23 rd 2015	Free Day for the Delegates, No Official Program	
May 23 – May 27, 2015	APCOM Registration – APCOM OFFICE	RAMPART ROOM, WESTMARK HOTEL
May 23 – May 27, 2015	Authors' Preparation Room	CHENA , WESTMARK HOTEL
May 24 th / 6:00-7:00 PM	APCOM Reception & Drum Circle (With Robert Parr)	EAST MIDDLE, WESTMARK HOTEL
Monday-May 25th 2015		
8:00 AM-12:30 PM	Morning Keynote Session (EAST MIDDLE)	Sukumar Bandopadhyay
	Welcome Address	Dr. Sukumar Bandopadhyay Mayor Luke Hopkins (Fairbanks North Star Borough) J. Steven Gardner (2015 SME President)
	The Story of APCOM after 50 years: Some things change, some things remain the same	Dr. Raja V. Ramani
	A New Paradigm for Smart(er) Mining Complexes and Mineral Value Chains: A technological perspective on risk management and sustainability	Dr. Roussos Dimitrakopoulos
	The Sasquatch of Geostatistics: Myths that are much talked about, but rarely seen	Dr. Clayton V. Deutsch
9:55 AM-10:10 AM	Coffee-Break	
	Reliability in Mining: The Past, the Present and the Future	Dr. Uday Kumar
	3-D modeling of minerals: A case study from Sweden	Dr. Pär Weihed
F-2015-162	Hybrid Robotics in Mining	Dr. George Danko
	Mine Automation	Dr. Arman Melkumyan
12:30 PM-2:00 PM	Lunch-Break (WEST GOLD)	
2:00 PM-3:40 PM	Geostatistics I (MINTO)	Session Chairs: Roussos Dimitrakopoulos & Tushar Gupta
F-2015-047	Sensitivity of indirect recoverable mineral resource modelling to the distribution of Selective Mining Units within panels for mining projects	Winfred Assibey-Bonsu and Charles Muller

F-2015-183	Comparison of Fort Knox Gold Deposit Resources from Pre-feasibility (1991) to Production (1999-2015).	Harry M. Parker, Eric Hill and Rebeca Morgan
F-2015-086	Using large support data to improve grade prediction in underground mining	Marcel Antonio Arcari Bassani, Péricles Lopes Machado, João Felipe Coimbra Leite Costa and Ricardo Hundelshausen Rubio
F-2015-061	Determination of the Risk Index Reference values Applied to Brazilian Phosphate Mines	F. G. Fernandes, C. M. Pinheiro and E. M. Apparicio
F-2015-152	Comparison between disjunctive kriging and multi-Gaussian kriging to estimate the recoverable reserve for a beach sand deposit in India	Mainak Thakur, Biswajit Samanta and Debashish Chakravarty
2:00 PM-3:40 PM	Production Scheduling I (YUKON)	Session Chairs: Biswajit Samanta & Nelson Morales
F-2015-009	A surface constrained stochastic mine production scheduling method and its application at a copper deposit	Alexandre Marinho and Roussos Dimitrakopoulos
F-2015-017	The impacts of slope angle approximations on open pit mining production scheduling	Filipe S. Beretta and Alexandre Marinho
F-2015-102	A Fast Optimum Pit Limit Analysis Method Based On Revised Maximum Flow Algorithm	Chotipong Somrit and Kadri Dagdelen
F-2015-074	Using the Bienstock-Zuckerberg Algorithm to Solve Underground Production Scheduling Models	Andrea Brickey, Barry King and Orlando Rivera
3:40 PM-3:50 PM	Coffee-Break	
3:50 PM-5:30 PM	Project Evaluation (YUKON)	Session Chairs: Mike Nelson & Daniel Espinoza
F-2015-021	Asset Performance – Getting the most from your assets	Joseph Plant
F-2015-057	An agent-based approach to evaluating the effect of dynamic age changes on community acceptance of mining project	Mark K. Boateng and Kwame Awuah-Offei
F-2015-105	The Systematic Mining Project Evaluation Criteria (SYSPEC) for Investment Decisions	Hyung Min Park and Michael G. Nelson
F-2015-046	Restructuring of a Greek Toll Road Concession Project	Gabriel Böde Jiménez; Dimitrios Gatsonis and Klaus Böde
3:50 PM-5:30 PM	Mine Planning I (EAST MIDDLE)	Session Chairs: Peter Dowd & Snehamoy Chatterjee
F-2015-016	Traditional versus stochastic mine planning under material type and grade uncertainties	Alexandre Marinho and Luis Martinez Tipe
F-2015-066	A Comprehensive Approach to Strategic Open Pit Mine Planning with Stockpile Consideration	Mohammad Tabesh, Hooman Askari-Nasab and Rodrigo Peroni

F-2015-079	Using simulation to assess the trade-off between value and reliability in open pit planning	Maximiliano Alarcón, Xavier Emery and Nelson Morales
F-2015-099	Optimal Economic Envelope of Joint Open-Pit and Underground Mines	Cecilia Julio, Jorge Amaya, Amina Lamghari and Nelson Morales
F-2015-101	Comparing new and traditional methodologies for production scheduling in open pit mining	Marcos Goycoolea, Daniel Espinoza, Eduardo Moreno and Orlando Rivera
6:00 PM-7:00 PM	APCOM International Council Meeting	CHENA, WESTMARK HOTEL
Tuesday-May 26th 2015		
8:00 AM-10:00 AM	Mine Exploration (EAST MIDDLE)	Session Chairs: Christina Dohm & Marcel Arcari Bassani
F-2015-023	Automated lithological recognition using DTW signal processing of natural gamma logs	Katherine Silversides, Arman Melkumyan and Derek Wyman
F-2015-028	Core Partial Recovery and Its Effect on Sample Grades	Vivian Tavares Kayser and João Felipe Costa
F-2015-070	Geological domain classification using multiple chemical elements and spatial information	M. Balamurali and A. Melkumyan
F-2015-081	Plotting Multi-Element Geochemical Data in Three Dimensions to Aid in Predicting Ore Recovery and Mineral Exploration Targeting	Maureen N. Moore-Roth and Cesar Carrasco
F-2015-115	Achievements from application of the Hylogger 3 to the mining industry in Chile	Victor Montenegro, Nicolas Urrutia, Leandro Voisin and Angus McFarlane
F-2015-116	Application of the Hylogger 3 to the characterization of mineral and metallurgical residues	Leandro Voisin, Javier Merrill, Victor Montenegro and Angus McFarlane
8:00 AM-10:00 AM	Mineral Processing (YUKON)	Session Chairs: Guven Akdogan & G. V. Rao
F-2015-042	Strategic planning of metallurgical extraction using Variable Neighbourhood Descent and the Network Simplex Method	Alessandro Navarra
F-2015-120	A Discrete Element Model for Vibrating Air-Table Separators	Nikhil Gupta, Gerald Luttrell and Tathagata Ghosh
F-2015-134	Advances in Modeling of Air-based density separators	Tathagata Ghosh
F-2015-135	Project Life Cycle Process Modelling and Simulation Using the Limn@ Toolset	David Wiseman, Robert Bratton and Gerald Luttrell
F-2015-166	A CFD Model Development for the Flotation Rate Constant	M. Karimi, G. Akdogan and S. M. Bradshaw
F-2015-178	Modeling and optimization of spiral concentrator for separation of iron values from sub grade iron ore	G. V. Rao, R. Markandeya and S. K. Sharma
8:00 AM-10:00 AM	Mine Ventilation (MINTO)	Session Chairs: B. S. Sastry & Purushotham Tukkaraja

F-2015-002	Ventilation System Design for the Sanford Underground Research Facility	Tyler R. Artz, Purushotham Tukkaraja and Bryce Pietzyk
F-2015-032	Investigation of the parameters of the air flow in the longwall area for validation of the VentZroby simulation software	W. Dziurzynski, T. Palka and St. Wasilewski
F-2015-078	Sensitivity Study on Ventilation Parameter Changes in a Mine Ventilation System	Gary Li and Steve Hardcastle
F-2015-148	Optimization of Mine Ventilation Networks Using the Weighted Augmented Lagrange Method	W. Nyaaba, S. Frimpong and K. A. El-Nagdy
F-2015-060	Monitoring systems for coal mines utilizing booster fans	V. Gangrade, F. Calizaya, and M.G. Nelson,
10:00 AM-10:30 AM	Coffee-Break	
10:30 AM-12:30 PM	Mine Discrete-System Simulation (EAST MIDDLE)	Session Chairs: Ernest Baafi & Alexandre Marinho
F-2015-013	Optimization of open pit haulage cycle using a KPI controlling alert system and a discrete-event operations simulator	Pedro Pablo Vasquez Coronado and Victor Octavio Tenorio
F-2015-024	Using Discrete Simulation and Animation to Identify the Optimal Sizes and Locations of Mine Refuge Chambers	Ebrahim Tarshizi, Charles Kocsis and Danny Taylor
F-2015-043	Discrete event simulation to quantify upgrades of Peirce-Smith converting aisles	Alessandro Navarra and Frank Mucciardi
F-2015-104	Optimizing design parameters for ground articulating pipeline system using discrete event simulation	Sisi Que, Kwame Awuah-Offei and Samiel Frimpong
F-2015-108	Simulation and Optimization in Open Pit Mining	Shiv Prakash Upadhyay, Hooman Askari-Nasab, Mohammad Tabesh and Mohammad Mahidi Badiozamani
F-2015-137	Investigation into mine equipment subsystems availability and reliability data modelling using discrete event simulation	E. Gbadam, K Awuah-Offei and S. Frimpong
10:30 AM-12:30 PM	Geotech-Rock Mechanics (MINTO)	Session Chairs: Srikant Annavarupa & Stan Vitton
F-2015-003	Development of Drones to Collect Geotechnical Data in Large Underground Mines	Srikant Annavarapu and P. Ganesh Kumar
F-2015-053	Rock mechanics of tabular deposits - a computational challenge	William G. Pariseau and Michael K. McCarter
F-2015-113	Application of 3D geotechnical block models in design of open pit mines – A Case study at Mont-Wright Open Pit Mine	Hesameddin Eivazy, Kamran Esmaili, Raynald Jean and Francisco Albor
F-2015-168	Technological and Geomechanical Modelling for Mining Safety Improvement	Anatoly A. Kozyrev, Sergey V. Lukichev, Oleg V. Nagovitsyn and Inna E. Semenova

F-2015-181	Evaluation of Various Mining Methods to Design an Underground Coal Mine Using FLAC 2D	Taraprasad Bhowmick, Tushar Gupta, Gang Chen, Sukumar Bandopadhyay and Tathagata Ghosh
10:30 AM-12:30 PM	Geostatistics II (YUKON)	Session Chairs: Thomas Oommen & João Felipe Costa
F-2015-091	Grade Modelling with Local Anisotropy Angles: A Practical Point of View	David F. Machuca-Mory, Harri Rees and Oy Leuangthong
F-2015-150	Local truncated pluri-Gaussian mask optimization for categorical variable modeling with locally varying proportions	Samaneh Sadeghi and Jeff B. Boisvert
F-2015-153	Dealing with periodicity within the Kriging Framework	Leon Tolmay
F-2015-122	Incorporating distributed Dijkstra's algorithm into variogram calculation with locally varying anisotropy	Oscar Peredo, Felipe Navarro, Mauricio Garrido and Julián M. Ortiz
F-2015-080	Expected uncertainty as a function of the variogram, data spacing and other factors	Felipe A. C. Pinto and Clayton V. Deutsch
12:30 PM-2:00 PM	Lunch-Break (WEST GOLD)	
2:00 PM-3:40 PM	Mine Planning II (EAST MIDDLE)	Session Chairs: Rodrigo Peroni & Taraprasad Bhowmick
F-2015-173	Geometallurgical models for the quantification of uncertainty in mining project value chains	Stephen Coward and Peter Dowd
F-2015-136	Application of the metaheuristic approaches in open pit mine planning	Javad Sattarvan, Omid Gilani, Masoud Soleymani Shishvan and Asif Khan
F-2015-034	A Dynamic-ore-price-based Method for Optimizing a Mineral Supply Chain with Uncertainty	Jian Zhang and Roussos Dimitrakopoulos
F-2015-033	Management Support System for a fleet of vehicles in an Open Pit Mine	Esteban Chumpitaz Saravia, Magno Huamaní Condori and Miguel Ángel Pacoticona Ccoa
F-2015-007	Resource Model Uncertainty Analysis and Stope Optimizer (MSO) Evaluation for an Underground Metal Mine Project	Arja Jewbali, Honglinang Wang and Christopher Johnson
2:00 PM-3:40 PM	CFD Application in Mine Ventilation (MINTO)	Session Chairs: Jurgen Brune & Heather Dougherty
F-2015-006	Preliminary Analysis of Surface Mine Inversion Dispersion Techniques through Numerical Simulations	Matthew Murphy and Purushotham Tukkaraja
F-2015-045	Gob Ventilation Modeling on HPC platforms using GPGPU/CPU Combinations	R. C. Gilmore, J. F. Brune, J. A. Marts, Saqib A. Saki, G. E. Bogin Jr. and J. W. Grubb
F-2015-160	Validation of Empirical Models for Shock loss due to Regular Obstructions in Mine Airways using CFD	Srivatsan J. S. and B. S. Sastry
F-2015-075	Application of Genetic Algorithm for Solving Multiple Fan	Mahesh Shriwas and Felipe Calizaya

	Ventilation Network	
2:00 PM-3:40 PM	Computer Modeling in Unconventional Resource Development (YUKON)	Session Chairs: Abhijit Dandekar & Sudiptya Banerjee
F-2015-049	Production Performance Prediction and Field Development Design Tool for Coalbed Methane Reservoirs: A Neuro-simulation Approach	Vaibhav Rajput, E.D.K. Basel and Turgay Ertekin
F-2015-073	Modeling of Asphaltene Component Segregation and Tar Mat Formation	Venu Nagineni, Sukit Leekumjorn and Christian Agger
F-2015-107	Computer in Pore-Network Modeling and Prediction of Flow and Transport Properties in Porous Media	Fidelis O. Wopara, Sunny E. Iyuke and Abhijit Dandekar
F-2015-133	Accelerating Autonomous Flow Control Technology Adoption by Albertan SAGD Operators via a Simulator-Validation Process	Sudiptya Banerjee
3:40 PM-3:50 PM	Coffee-Break	
3:50 PM-5:30 PM	Mine Operations (EAST MIDDLE)	Session Chairs: Hooman Askari-Nasab & Tathagata Ghosh
F-2015-012	Application of the Theory of Constraints to the Pillar Development Cycle of an Underground Coal Mine	Ernest Baafi, Dalin Cai and Ian Porter
F-2015-019	Optimization of Dragline Digging Sequences Using a Genetic Algorithm	Xin Liang, Peter Knights and Andrew Jessett
F-2015-050	Challenges of multi-mine simultaneous optimisation for a large iron ore mining operation	Johann Menezes and Farshad Rashidi Nejad
F-2015-077	Investigation of Electric Rope Shovel Reliability, Availability and Maintainability in Surface Mining Operation	Mohammad Babaei Khorzoughi and Robert A. Hall
3:50 PM-5:30 PM	Mine Design Simulation (YUKON)	Session Chairs: Ebrahim Tarshizi & Jennica L. Bellanca
F-2015-098	A novel approach to data mining and simulation of haul processes on mining operations	Andrés Latorre, José Miguel Castro and Carlo Calderón
F-2015-092	Linear programming approximations for modeling instant-mixing stockpiles	Eduardo Moreno, Daniel Espinoza, Felipe Ferreira, Marcos Goycoolea, Alexandra Newman and Mojtaba Rezakhah
F-2015-100	An ant colony optimization-based approach for long distance ore pipeline routing	Daniel Baeza, Christian F. Ihle, and Julián M. Ortiz
F-2015-044	Optimization of Time Duration to Install Face Equipment at Longwall Face in Indian Coal Mines	G. C. Roy and Netai Chandra Dey

3:50 PM-5:30 PM	Decision Making (MINTO)	Session Chairs: Kadri Dagdelen & Katherine Silversides
F-2015-095	Decision support system for mining methods selection using Bayesian belief networks	Todor P. Petrov and Jhon Silva-Castro
F-2015-037	Optimization based on Critical Path Methods in VULCAN Gantt Scheduler	Daniel Arancibia C., Marcelo Arancibia A. and Ignacio García A.
F-2015-063	Evidential reasoning: Potential usage for decision making under uncertainty in mining engineering	Vahagn Khechadorian, Morteza Osanloo and Seyyed Pedram Mirmoini
F-2015-026	Resumption of Deep Open-Pit Mining as a Future Challenge	Delaram Pahlevani and Morteza Osanloo
7:00 PM-10:00 PM	APCOM Dinner & Awards (MIDDLE EAST) (Cash Bar-6:30-7:00PM)	Banquet MC- Debu Misra
Wednesday-May 27th 2015		
8:00 AM-10:00 AM	Miscellaneous (MINTO)	Session Chairs: David F. Machuca-Mory & Arman Melkumyan
F-2015-031	Virtual Reality Ladder Climbing for Mine Safety Training	Chengyuan Lai and Ryan P. McMahan
F-2015-055	Development of a Generic Mine Visualization Tool Using Unity	Timothy J. Orr, Brendan D. Macdonald, Stephen R. Iverson and William R. Hammond
F-2015-126	Particle tracking simulation for tracer dispersion in porous media: a five-spot laboratory model	Arif Widiatmojo, Kyuro Sasaki, Amin Yousefi-Sahzabi and Yuichi Sugai
F-2015-132	The Effect of the Simulation Environment on Cognitive Workload Metrics	Jennica L. Bellanca, Brianna Eiter, Timothy J. Orr and Brendan Macdonald
F-2015-163	Design principles for a mining interface	Heather Dougherty, Kramer Luxbacher, Nino Ripepi, Michael Karmis and Zacharias Agioutantis
F-2015-029	A conceptual approach to design a magnetically-propelled integrated underground hoisting system	Taraprasad Bhowmick and Pratik Dutta
8:00 AM-10:00 AM	Drilling and Blasting (EAST MIDDLE)	Session Chairs: Piyush Rai & Rajib Ghosh
F-2015-182	Application of Computers in Surface Mine Rock Blasting - Current & Future Perspectives	Dr. Piyush Rai
F-2015-064	Blast Fragmentation Size Analysis Using Normalized Graph Cut based Image Segmentation Technique	Pankaj Rathi, Ashok Kumar Patel and Snehmoy Chatterjee
F-2015-088	Assessment processes of construction and drilling & blasting integration through a technology platform	Mauricio Vargas, Nolberto Contador, Edgardo Hernández, Ricardo Torres and Andrés Latorre
F-2015-068	Modeling Blasting Costs Based on Regulated Structure's	Mohammadhossein Sadeghiamirshahidi, Stan

	Location and Environmental Constraints	Vitton and Thomas Oommen
F-2015-165	The use of specific energy in rotary drilling: the effect of operational parameters	Rajib Ghosh, Håkan Schunnesson and Uday Kumar
F-2015-167	Discrete element simulation of rock cutting	G. van Wyk, D.N.J. Els, G. Akdogan, S.M. Bradshaw
10:00 AM-10:30 AM	Coffee-Break	
10:30 AM-12:30 PM	Underground Mining (YUKON)	Session Chairs: Winfred Assibey-Bonsu & G. C. Roy
F-2015-036	Online work capacity monitoring and work-rest scheduling for different job nature of underground miners	Netai Chandra Dey and A. Somesh Vikrant
F-2015-155	Towards Extracting Absolute Roughness from Underground Mine Drift Profile Data	Curtis Watson and Joshua Marshall
F-2015-158	Underground Mine Design under Stochastic Scenarios	Paulo Roberto Guimarães Mello, Rodrigo de Lemos Peroni, João Felipe Costa and Rodney Wolff
F-2015-169	Process Optimization in Mining: Preconditions, step-by-step implementation and benefits	Christoph Mueller
F-2015-001	Baseline Analysis of Predicted Tracking System Performance	Steven Schafrik, Michael Karmis and David Snyder
F-2015-067	FEATureFACE – An Innovative Collision Avoidance System for the Underground Mining Industry	Kai Neumann, Jan Berg, Britta Eichtopf, Philipp Mehnert and Karl Nienhaus
10:30 AM-12:30 PM	Off-shore Placer resource estimation (MINTO)	Session Chairs: Netai Dey & Victor Tenorio
F-2015-090	Support Vector Machines: An Emerging Technique for Ore Grade Estimation	Snehamoy Chatterjee, Sridhar Dutta, Sukumar Bandopadhyay and Biswajit Samanta
F-2015-014	Resource estimation of an off-shore platinum deposit using sequential Gaussian simulation	Victor Octavio Tenorio and Sukumar Bandopadhyay
F-2015-157	Improved ore grade estimation using clustering and support vector machines	Sridhar Dutta, Sukumar Bandopadhyay and Debasmita Misra
F-2015-176	Development of a Methodology combining Clustering and Conditional Simulation for the Definition of Underwater Sampling Models	Victor Octavio Tenorio, Sukumar Bandopadhyay, Debasmita Misra, Sathy Naidu and John Kelley
F-2015-177	Support Vector Machines Applied for Resource Estimation of Underwater Glacier-type Platinum Deposits	Victor Octavio Tenorio, Sukumar Bandopadhyay, Debasmita Misra, Sathy Naidu and John Kelley
12:30 PM-2:00 PM	Lunch-Break (WEST GOLD)	

2:00 PM-3:40 PM	Geostatistics III (YUKON)	Session Chair: Harry Parker & Samaneh Sadeghi
F-2015-179	Assessment of thickness uncertainty using geostatistical simulation in the Rondon do Pará Bauxite Deposit, Brazil	Saulo B. de Oliveira, Jeff B. Boisvert and Clayton V. Deutsch
F-2015-121	How precise and accurate is the space of uncertainty derived from simulations?	Rafael M. Caixeta, João F. C. L. Costa, Péricles L. Machado, Diniz T. Ribeiro, Dione H. Dias & Rafaeli O. Pires
F-2015-146	A spatial uncertainty index of subsurface models for drill hole planning	Marie-Gabrielle Vallet, Denis Marcotte and François Guibault
F-2015-030	Geostatistical prediction of fugitive dust dispersion in open pit haul roads	Taraprasad Bhowmick and Sukumar Bandopadhyay
2:00 PM-3:40 PM	Mine Planning III (MINTO)	Session Chairs: Kei Neumann & Honglinang Wang
F-2015-018	Low quality secondary data in short term mining planning: use or discard them?	Cristina da Paixão Araújo, Marcel Arcari Bassani and João Felipe Coimbra Leite Costa
F-2015-035	Optimizing a mining complex under supply uncertainty: Integrating components from deposits to transportation systems	Luis Montiel Petro and Roussos Dimitrakopoulos
F-2015-041	Stochastic Optimization of an Open Pit Mining Complexes with Capital Expenditures: Application at a Copper Mining Complex	Ryan Goodfellow and Roussos Dimitrakopoulos
F-2015-174	Calculating Correlation and Causality of the Impact of Social Media Interaction on the Social Risk of Mineral Development	Sean Dessureault and W. Pratt Rogers
3:40 PM-3:50 PM	Coffee-Break	
3:50 PM-5:30 PM	Production Scheduling II (YUKON)	Session Chairs: Christoph Mueller & Maureen N. Moore-Roth
F-2015-082	A Comparison of Conventional and Direct Block Scheduling Methods for Open Pit Mine Production Scheduling	Nelson Morales, Enrique Jélvez, Pierre Nancel-Penard, Alexandre Marinho and Octávio Guimarães
F-2015-171	Strategic mine planning and Production Scheduling Optimization at Newmont's Twin Creeks Operation	Kazuhiro Kawahata, P. Schumacher, M. Fein and Kurt Criss
F-2015-175	Mining options optimization: concurrent open pit and underground mining production scheduling	Eugene Ben-Awuah, Otto Richter and Tarrant Elkington
F-2015-083	Multi-criteria optimization for scheduling of a bench and fill mine	Nelson Morales, Alejandra Gómez and Javier Vallejos
	APCOM 2017 Invitation	TBA